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Large Rail Orders Pending

Increased Mill Operations in January—Pig Iron Buying Lessening

The steel companies have made some further progress in establishing higher prices for their products in the past week and now look for railroad buying to reinforce the position in which the recent heavy volume of low-priced business has put them.

Unlike the movements which in other periods have proved to be definite turnings of the tide, the present one comes at a time in the year when demand lags; thus it lacks the usual accompaniment of mill resumptions and of increased working forces. What is counted on by those who predict large things for 1912 is that orders now on hand will carry them well into March at a high rate of output and that spring business will then be sufficient to fill up their books beyond the middle of the year. It is contended that speculative buying has entered little into the movement thus far, though it is known that in bars the rebuilding of merchant stocks has figured somewhat.

The accumulation of large forward orders at low prices has operated in contrary ways—it has enabled producers to take a stand for higher prices and at the same time has led doubters to question why more space was not reserved for the higher priced business predicted for 1912. The crux of the situation is, as always, the country's consumptive requirements. Some of the current reasoning based on dammed-up needs may require revision. In rails, for example, 3,600,000 tons was produced last year, and probably 2,700,000 tons this year. The country's use of steel has not been small, as was the case before the movement of 1909.

Actual market developments have plainly modified selling policies, as indicated by the establishment of 1.15c., Pittsburgh, for steel bars in the past week, and by the disappearance of recent low prices for structural shapes and plates.

It had been expected that a number of blast furnaces of the Steel Corporation would be banked over the holidays, but the order has been given to operate them as usual. Several additions to the list of the Corporation's active furnaces are scheduled for January.

Heavy buying by the railroads is impending. In rails announcements of contracts for 500,000 to 600,000 tons are expected within the next fortnight, the buyers including the New York Central, Pennsylvania, Baltimore & Ohio, Atchison, Southern Railway and several Western lines. In the Chicago district about 100,000 tons is pending and likely to be closed within the week. The Nickel Plate has bought 4000 tons of Bessemer rails. A Brazilian road has ordered 22,000 tons from the Steel Corporation. Spike orders have increased under low prices, three lines having contracted for 75,000 kegs in the past week.

The Pennsylvania car order, it is now definitely

stated, will be for 24,000 cars, which will require fully 300,000 tons of steel.

Wire and sheet and tin plate mills will operate on increased schedules after January 1. At present tin plate plants are running at about 70 per cent. of capacity against 50 per cent. a few weeks ago. The wire and tin plate operations of the Steel Corporation and the steel production of the Carnegie Steel Company will be on a 90 per cent. basis in January.

Pig iron markets are quieting down after a month of heavy buying, the marked feature of which was that it left prices practically unchanged. However, Southern iron, in which the weakness was pronounced, is firm on the $10 basis, while $10.25, Birmingham, is asked for the entire first half of the year.

Bessemer iron is stronger, and $14.25 at Valley furnace is now maintained. A sale of 25,000 tons for January and February is reported at that price, but there is an accompanying ore transaction.

Foreign producers of ferromanganese, who have had that market well in hand for some time, announce an advance from $38.50 to $41, Baltimore.

Conditions in German, British and Belgian markets show steady improvement. Pig iron warrants touched 49s. 10½d. this week, an advance of more than 2 shillings in two weeks. German advices from high sources are that the renewal of the Steel Works Union next year is now practically assured.

Lake Superior ore interests have given no warrant for the reports concerning a definite reduction in prices for 1912. There has been no action, and the real measure of the present improvement in the steel trade cannot be taken thus early. Stocks of Lake ore in furnace yards and on docks December 1 were 33,821,000 tons, or about 550,000 tons less than one year previous.

The Improvement in the Steel Trade

The personal equation, individual experience and local conditions have entered largely into the reception given the very cheerful views of the iron trade outlook which have had so much publicity in the past week. With surprising readiness the opinion of a leader in the steel trade that 1912 would be a year of unusually large demand for iron and steel was caught up and made the basis of highly favorable forecasts. The peculiar temperament which flourishes in the southern precincts of Manhattan Island and which demands that conditions be either very good or very bad is naturally allied at present with the prosperity propaganda, and judging from some of the product of the week the whole face of the situation has changed. On the other hand, as showing the effect of local conditions, we have the skepticism of Philadelphia, for example, whence comes the intelligence that the pig iron trade has changed but little in the past few weeks; that mills in Eastern Pennsylvania are still running at much less than full capacity, and that judging from the slight decrease in the rate of pig iron production in the country in November, there is no electrifying revival in progress in any other district.

The extent to which the psychological element enters into the "business situation" is well known. The contagion of fear has many times brought financial disaster and then has operated to prevent recovery. In what has happened in the past week we have the opposite influence and the opposite effect. Concurrently with an advance of $1 a ton in bars, wire and sheets, and with the publication of facts which had not been generally known, of the extent to which large steel companies have taken contracts for forward delivery, came the statement concerning Mr. Frick's very hopeful views of business in iron and steel for 1912. This expression by an individual was taken to represent to a degree the attitude of large financial and industrial interests, and straightway there was a multitude of followers.

It was natural that such a sharp transition from a condition in which no one was willing to make a favorable forecast of 1912 should encounter skepticism. But some current comments on the simple facts as they have developed in iron and steel markets have failed to recognize the possibility that the foundation was being laid in the very low prices of recent weeks for at least a moderate forward movement. So much has been made of the political features of the situation that some instructive iron trade history has been neglected. There is no discrepancy between the booking of large orders for forward delivery and a practically unchanged schedule of mill operations for November and December. The instinct of the merchant has again asserted itself and we have had, thus far on a much smaller scale than in 1909, a repetition of the buying for the rebuilding of stocks that made memorable the upward movement of that year. The restocking of 1909 culminated in the early months of 1910. Many thought then that the country was asserting the establishment of a new high rate of iron and steel consumption which might be maintained for many months. But when stocks of finished steel had been repaired at the low prices the real rate of consumption showed itself. There should be no haste to conclude now that the business of the country has started on an unbroken upgrade. Prices have improved on some forms of finished material; on pig iron the improvement in that respect is scarcely measurable as yet. The mills with some exceptions, as in plates and rails, have a good winter's work ahead and some of them are well sold into the late spring. If the necessities of the railroads are what they have long been represented to be, that business, added to what is now on the books, will mean that the first half of 1912 has been fairly provided for. Whether next year's profits will be even on the scale of 1910 is still much of a question. And as for a boom in the steel trade, whether measured by profits or volume, signs of anything which may truthfully warrant that name have not yet put in an appearance.

American Steel Prices Below Foreign

Statements that steel prices in the United States have fallen below those obtaining abroad are sometimes received with incredulity, perhaps because it is not realized how great a decline there has been in the American market in the past four years, while the foreign markets have declined but little. Inasmuch as our prices have shown a rather sharp advancing tendency in the past two or three weeks it is well to make comparisons, not with the shifting level of the present, but with the recent low prices, which it is possible may pass into history as constituting an important turning point; and prices prevailing on large and desirable orders should be used for comparative purposes, rather than prices on relatively small lots. We shall, then, use as a basis billets at $18.50 per gross ton, sheet and tin plate

bars at $19 per gross ton, merchant bars, plates and shapes at 1.05 cents per lb., tin plates at $3.30 per base box, etc.

The decline in American prices since the sudden let-up in activity after the panic of October, 1907, may be shown briefly by the statement that a careful averaging of prices of all finished steel products outside of rails, having regard to the relative importance of the different classes of material, indicates that from October, 1907, to the recent low point there was a decline of between $12.50 and $13 per net ton, or between $14 and $15 per gross ton. Comparing prices in England at the middle of October, 1907, and at present, we find that there has been an advance of about 50 cents per ton in iron ore, while pig iron has declined from $1.50 to $2.50 and finished steel prices as a rule are from $2.50 to $5 lower. Tin plates, however, have declined only 6d. per box, say $2.50 or $2.75 per ton. For our prices at present to be above those ruling abroad would require a very great disparity to have existed in 1907, which was not the case. The low point in American prices of ore, pig iron, unfinished steel and finished steel was in the years 1897 and 1898, when labor and all commodities were at their lowest. The advances in the decade following were due in part to prosperity in the American iron trade, but were also due in part to heavy advances in labor and commodities. Whether the prosperity caused the advances in wages or the advances in wages caused higher prices is not a matter of consequence in this connection. It is sufficient to observe that the average value of all commodities did advance strikingly; and however wage advances were brought about, higher wages were a necessity because the cost of living had greatly increased. Bradstreet's index number, for instance, advanced about 50 per cent. from its low point in the nineties to 1907. The advance in wages and commodity prices was not confined to the United States, but was world wide. As a necessary consequence, prices of iron and steel abroad also advanced, and if they did not advance altogether as much as prices in the United States, they advanced very greatly, while on the other hand it is emphatically the case that since the close of 1907 they have not declined nearly as much as prices in the United States. British prices of finished steel, as just indicated, have declined only from one-fifth to one-third as much as American prices since 1907.

It is in the finished products, rather than in the mineral products and pig iron, that our prices are now below those obtaining abroad. Since the great increase in the efficiency of American labor through the introduction of improved machinery and processes, our handicap is in the assembling of raw materials, a fact which is recognized in the present agitation for lower freight rates on the raw materials of the blast furnace. Thus we find that pig iron is higher in the United States than in England, and as England exports about 1,200,000 tons of pig iron annually, 12 to 13 per cent. of her make, British pig iron quotations may be taken as fairly representative of the best that is done abroad. Middlesbrough No. 3 foundry iron, comparable with our ordinary No. 2 foundry iron, is now quoted at 48s. 3d., or $11.75, comparing with prices ranging from $13 to $14 f.o.b. our Northern furnaces, but with $10 at Birmingham, Ala., where our general handicap of high cost of assemblage does not obtain.

To consider another case which possibly may also be considered an exception, rails should be mentioned. The price of rails in the United States has not declined, when other finished steel products have declined $14 to $15 a gross ton, but the quality of rails has been improved. The regular English quotation on rails for the domestic market, at Middlesbrough, is £5 12s. 6d., or $27.37.

In all other finished steel products, prices abroad are uniformly above those which have lately obtained in the United States. Merchant bars at 1.05 cents in the United States compare with German prices for the domestic market of 1.16 cents for basic Bessemer and 1.20 cents for open-hearth, while in England merchant qualities bring 1.46 cents, delivered at Birmingham. Plates at 1.05 cents in the United States compare with 1.40 cents in Germany for ordinary grades, and with 1.50 cents in Great Britain for ship plates at Glasgow. The nominal export price on the continent is about 1.30 cents.

In tin plate, which has a much higher labor cost than any of the other ordinary finished steel products of the steel industry, the high standard of wages in the United States has prevented the price from falling as low as the foreign basis, but the approach is astonishingly close when we consider the wide spreads which used to exist, ranging around $1 a box, and even more. The regular tin plate quotation per box f.o.b. South Wales is now 13s. 6d., or $3.24, subject to a discount of 4 per cent., making $3.11 net. In large lots tin plate has lately sold in the United States at $3.30, or $3.45 for I. C., which is quoted in South Wales. With the customary 2 per cent. discount the latter makes $3.38 net, putting the American price only 27 cents a box above the British price, this being probably the closest approach to a parity that has ever obtained.

While pig iron prices are higher in the United States than abroad, prices of unfinished steel abroad approximate more nearly to finished prices, so that they exceed American prices just as do the finished steel prices abroad. In South Wales tin plate bars, recently advanced, command £5 or $24.33, compared with a price of $19 or less recently obtaining in the United States. The Belgian export price for sheet and tin plate bars is 90s., or $21.90, while the corresponding price for billets, 4 in. and up, is $84s., or $20.44, billets below 4 in. commanding a considerably higher price. The German price for wire rods in the domestic market is about $30, against $24 lately obtaining in our own market.

There was a time in the nineties when the United States found itself with some commodities selling at lower prices than those ruling abroad, and an export business of large proportions suddenly started. The ability to export, however, was confined almost entirely to the cruder materials, upon which the cost of assembling the raw materials bore much less heavily than at present. In 1898, for example, we exported 28,600 tons of billets, sheet bars, etc., and 291,038 tons of rails. Exports of the more finished products were relatively very light. In that year 249,357 tons of pig iron was exported, but this came almost wholly from Alabama, which still has a low cost of assemblage, but does not export because a domestic demand for its pig iron has developed of sufficient proportions. In the past decade an export movement has been built up in the more finished forms, there being a heavy movement in such items as merchant bars, sheets and plates, structural material, pipes and fittings, and even tin plates. Considering the lowness of American prices as compared with those ruling abroad, it is by no means surprising

to observe from the statistics of exports during the first 10 months of this year that the total tonnage of iron and steel exported in the calendar year bids fair to exceed the best previous record, made in 1910, by 42 per cent., and to exceed the best record before 1910, which was made in 1906, by 63 per cent.

The Demand for Second-Hand Machinery

In connection with the coming increased demand for machinery, referred to last week, dealers call attention to the change which has come over the market for second-hand equipment. It will be recalled that in 1906-7 this class of machinery was in tremendous demand. The depleted stocks of the builders compelled users to resort to every possible means of meeting their requirements. It made no difference if machines were very old indeed. The prices which they commanded compared very favorably with their original cost. Newer types occasionally sold at a premium over the new prices of the very latest models and in excess of the original cost to the user.. Some of the tools which were absorbed by the trade were curiosities of antiquity.

The dealers point out that this condition has been greatly changed in the five years which have intervened since the high tide of prosperity. The average price of a machine tool which dates back of the introduction of high speed steels has decreased materially, according to the experience of some of the largest houses which specialize in second-hand tools. In 1906, when the hight of the boom was first felt, the average user of machine tools was not thoroughly familiar with the great economic advantages of powerful machinery driving the new steel cutting tools. It was not fully recognized that to employ older methods meant a vastly greater cost of production. Of course there must always be makeshifts when the market is confined to machinery for delivery many months in the future. But, as one dealer puts it, a modern machine shop with a good cost system would as soon put in a wood-turning lathe to accomplish a given piece of work as to install an obsolete metal-working machine. This means that the progressive manufacturer has learned that inadequate machinery is worse than none. Therefore, the average second-hand tool which will be purchased will be years younger than the average of 1906 and 1907. The supply of such equipment is exceedingly small and there seems to be no promise that it will increase in any material way.

If these are the facts, the user will be more dependent upon new machinery than ever before. This in itself will constitute a material increase in demand for the products of the American machine shops. To go back again five years, if at that time users had had the present day attitude toward second-hand machinery the market for new machines would have been correspondingly greater, and deliveries would have been, if possible, worse than they were.

The reasons why the buyer of machine tools should avail himself of the present market are accumulating. If he waits for the rush which is inevitable, he will have to take his chance of getting equipment, with a strong probability that he will meet with serious and expensive delays. Few people realize the tremendous total of machine tools which has been specified in the United States. Considerations of expediency have up to the present withheld the necessary funds for the purpose. The moment the change comes and business revives in a large way, a condition which may be more or less sudden, funds will be released and the manufacturers and dealers will be deluged with hurry-up orders. A few weeks will probably eliminate the large stocks now on hand and then deliveries will fade into the future. It is a significant fact that most orders for machinery now being placed are on condition of immediate shipment. These are among the first specifications to be released after long months of holding back.

The Wrought Pipe Industry

In response to requests for specified information regarding the wrought pipe industry, the following is presented. No exact figures are available for the production of wrought pipe except those of the United States Steel Corporation. Its annual reports regularly present the quantity of wrought pipe its mills have turned out during the year. The other manufacturers of this class of product do not make public their production of pipe, but they furnish to the American Iron and Steel Association, Philadelphia, their production of skelp for conversion into pipe and the figures of skelp production published by that association are the nearest approximation to the production of pipe which can be obtained. They show the following output of all skelp mills, including those of the corporation, for the past two years:

Production of Skelp in the United States—Gross Tons.

Years.	Iron.	Steel.	Total.
1909	370,151	1,663,230	2,033,381
1910	350,578	1,477,616	1,828,194

The reports of the United States Steel Corporation show that in 1909 its mills produced 1,013,071 tons and in 1910 they produced 868,550 tons of wrought pipe. Comparing these figures with the totals given in the above table, after making allowance for loss in converting skelp into finished pipe, it will be found that the corporation made about 55 per cent. of the total wrought pipe output of the country in 1909 and about 53 per cent. in 1910.

The leading manufacturers of steel pipe are the following:

National Tube Company, Pittsburgh, Pa.
Youngstown Sheet & Tube Company, Youngstown, Ohio.
La Belle Iron Works, Steubenville, Ohio.
Wheeling Steel & Iron Company, Wheeling, W. Va.
Spang, Chalfant & Co., Inc., Pittsburgh, Pa.
Mark Mfg. Company, Chicago, Ill.
Republic Iron & Steel Company, Youngstown, Ohio.
Monongahela Tube Works, Pittsburgh, Pa.
Harrisburg Pipe & Pipe Bending Company, Harrisburg, Pa.
South Chester Tube Company, South Chester, Pa.
Crane Company, Chicago, Ill.

Although by far the greater part of the wrought pipe now manufactured and sold in this country is steel pipe, the manufacturers of wrought iron pipe maintain a firm footing in the trade as shown by the figures of skelp production given above. The leading makers of wrought iron pipe, such as the Reading Iron Company, Reading, Pa., and the A. M. Byers Company, Pittsburgh, Pa., have not only refrained from adding steel pipe to their product but have also steadily extended their manufacturing operations in recent years. Other manufacturers of wrought iron pipe are as follows:

Spang, Chalfant & Co., Inc., Pittsburgh, Pa.
Harrisburg Pipe & Pipe Bending Company, Harrisbug, Pa.
Longmead Iron Company, Conshohocken, Pa.
Monongahela Tube Company, Pittsburgh, Pa.
South Chester Tube Company, South Chester, Pa.
Susquehanna Iron Company, Columbia, Pa.
Wheeling Steel & Iron Company, Wheeling, W. Va.
La Belle Iron Works, Steubenville, Ohio.
Youngstown Sheet & Tube Company, Youngstown, Ohio.
Cohoes Rolling Mill Company, Cohoes, N. Y.

The St. Louis Foundrymen's Association, St. Louis, Mo., has elected J. P. Pero, president; B. Roy Mook, secretary, and W. S. Gemmer, treasurer. The vice-presidents are R. A. Bull, J. W. Kelly, William Schaelich, J. E. Gilbert, T. H. Smith, J. E. Cartwright, E. E. Squier, Jr., A. W. Phelps, Sanford Mitchell, P. Henningsen, J. W. Schroen and Paul Lindecker.

Eastern Steel Company to Lease Warwick

Negotiations are pending for the lease of the Warwick Iron & Steel Company, Pottstown, Pa., to the Eastern Steel Company, Pottsville, Pa., for a term of 99 years, the rental to be sufficient to pay 8 per cent on the Warwick Company's stock, which is the same dividend that has been paid on this stock recently. The Warwick Company is a manufacturer of pig iron, with two furnaces owned and one leased, and another stack under construction. It has a rated productive capacity of 275,000 tons of pig iron per year. The Eastern Steel Company has an open-hearth steel plant and manufactures billets and finished steel products, and the consummation of such a lease would put it in a position to control its supply of raw material.

The Warwick Iron & Steel Company has an authorized capital stock of $1,500,000, of which $1,486,714 is outstanding, par being $10. Last June the company issued three-year 6 per cent. notes to the amount of $300,000 to take up an $180,000 first mortgage, the 5 per cent bonds of which were called in June 1, and to retire the floating debt. Last year the Warwick Company earned upward of 18 per cent. on the stock, but its earnings have since fallen off in common with the experience of other iron manufacturers, although the report for the current year will probably show approximately 8 per cent. earned, or enough for dividend requirements.

The Eastern Steel Company manufactures shapes for structural buildings and bridge work and has an annual capacity of about 190,000 tons of finished rolled material. The company has acquired large iron ore interests in the Moa district of Cuba, amounting to 11,000 acres, and in addition has a lease on 1200 acres, in which there is estimated to be over 43,000,000 tons of iron ore. It has an authorized stock issue of $4,700,000 common, of which $3,650,000 is outstanding, and $4,700,000 7 per cent cumulative preferred stock, of which $2,000,000 is outstanding. The company on March 1 last had an outstanding funded debt of $2,429,000 first mortgage 5's due August 1, 1931.

The annual meeting of the Eastern Steel Company will be held January 24, while that of the Warwick Iron & Steel Company will be held February 12. It is expected that the lease will come before the respective stockholdrs for ratification at these meetings.

The Proposed Michigan Corporate Excess Tax

W. A. Dwyer, vice-president and general manager of the Art Stove Company, Detroit, Mich., is quoted as follows by the Detroit Free Press in regard to the proposed change in the Michigan tax system:

"The blow that a corporate excess tax would deal the stove industry of Michigan would be severe. There are about 125 stove factories in the country. The factories of Detroit compete with those of the Middle West. We contest the Middle West and the South with large factories in Aurora, Ill.; Piqua, Ohio, a number in Pennsylvania and some in Missouri. There are other factories, but these are the most important.

"The Eastern factories take care of the Eastern trade. Though there are factories in Massachusetts that are subject to the corporate excess tax of that State, those factories do not compete with the Michigan concerns to any extent. Their territory is practically limited to New England. But when we come into our own territory we find that our competitors are situated in States which are as favorable, so far as taxes are concerned, as Michigan now is, and in respect to labor they are even better situated.

"No one can say that Detroit is a cheap labor market. Most of our competitors, however, have the advantage of being able to draw a less costly labor supply. As to taxes an examination of the tax laws of the States in which our competitors are located will show how they are favored in that respect."

Mr. Dwyer referred to the Pennsylvania law which exempts domestic corporations engaged in manufacturing from taxation on that part of their capital stock employed in business within the State. This means that the stove factories pay little or no taxes to the State.

Illinois has a general property tax which demands that property be placed on the rolls at one-third of its actual value. There is a so-called corporate excess tax, but in practice it amounts to nothing. In Ohio, which now has the most strict laws in the Union, with the possible exception of Massachusetts, corporations pay, in addition to the general property tax, a tax of $1.50 a thousand on the par value of their outstanding capital stock. Missouri has a general property tax which does not fall heavily on manufacturers.

A corporation in Ohio which pays taxes amounting to $11,500 a year—$10,000 in general taxes which are limited by the statute to 1 per cent. of the valuation, and $1,500 capital stock tax—would in Michigan, under the proposed corporate excess tax law, pay about $20,000, figuring the average State rate for all purposes at $20.

Pittsburgh and Valley Freight Rates on Raw Materials

It is now expected that the case of the Mahoning and Shenango Valley iron and steel manufacturers who have asked for lower freight rates on ore, coal and coke will eventually be brought before the Interstate Commerce Commission. It was the intention of the manufacturers to deal directly with the railroad companies, and their argument as presented at a recent conference with the railroad officials in New York City was given in *The Iron Age* of November 23. Within the past week the railroads have replied that the reductions asked for cannot be granted.

In this connection interest attaches to the testimony given before the Stanley Committee at Washington, December 15, by United States Senator George T. Oliver of Pittsburgh. Senator Oliver contended that the rate on iron ore from Lake Erie to Pittsburgh district furnaces, which is now 96 cents, should be 50 cents a ton. In connection with his testimony reference was made by members of the committee to the division of the ore freight rate from Lake Erie to the blast furnaces of the Carnegie Steel Company and the Jones & Laughlin Steel Company, with the connecting railroads of these two companies. The amount they received of the 96-cent rate was said to be 26 cents a ton. His attention being called to the testimony of Charles M. Schwab that the net rates on ore to certain Pittsburgh consumers were relatively lower than on Lake ores to South Bethlehem, Senator Oliver said that a Bethlehem plant would naturally obtain its ores from abroad or in the East and that no one would think of building a steel plant at Bethlehem based on a Lake Superior ore supply.

Allis-Chalmers Protective Committees

Protective committees have been formed for both the preferred and common stockholders of the Allis-Chalmers Company. The preferred stock will be represented by Charles Allis, chairman; G. W. McGarrah, president of the Mechanics and Metals National Bank; W. E. Roosevelt of Roosevelt & Son; M. N. Buckner, vice-president of the New York Trust Company, and H. W. Falk, president of the Falk Company, Milwaukee. The New York Trust Company will act as depositary for the stock, for which receipts will be issued.

Alexander J. Hemphill is chairman of committee to look after the common stockholders and the Guaranty Trust Company the depositary. Associated with Mr. Hemphill are Frederick Strauss, J. Horace Harding and Albert H. Wiggin.

Electric Steel Castings.—The Treadwell Engineering Company, Easton, Pa., has installed an electric furnace of its own design for the manufacture of steel castings. It is believed that this company is now the only manufacturer of this type of steel castings in the United States. Vice-president W. E. Farrell, of this company, has made a special study of the electric furnace not only in the United States but abroad, and the manufacture of the new product is therefore entered upon with confidence. Special attention will be given to the requirements of those users of steel castings who are desirous of procuring such products in which the physical character and chemical analysis can be absolutely guaranteed.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Dec. 20, 1911.	Dec. 13, 1911.	Nov. 22, 1911.	Dec. 21, 1910.
PIG IRON, Per Gross Ton:				
Foundry No. 2 standard, Philadelphia	$14.85	$14.85	$14.90	$15.50
Foundry No. 2, Valley furnace.	13.00	13.00	13.25	13.75
Foundry No. 2 Southern, Cincinnati	13.25	13.25	13.25	14.25
Foundry No. 2, Birmingham, Ala.	10.00	10.00	10.00	11.00
Foundry No. 2, at furnace, Chicago*	14.00	14.00	14.00	16.00
Basic, delivered, eastern Pa.	14.25	14.25	14.50	14.75
Basic, Valley furnace	12.25	12.25	12.35	13.25
Bessemer, Pittsburgh	**15.15**	14.90	14.90	15.90
Gray forge, Pittsburgh	13.40	13.40	13.40	13.90
Lake Superior charcoal, Chicago	16.50	16.50	16.50	18.00
COKE, CONNELLSVILLE,				
Per Net Ton, at Oven:				
Furnace coke, prompt shipment.	**1.60**	1.55	1.55	1.45
Furnace coke, future delivery	1.65	1.65	1.65	1.75
Foundry coke, prompt shipment	1.90	1.90	1.90	2.00
Foundry coke, future delivery	2.15	2.15	2.10	2.10
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	19.00	19.00	19.00	23.00
Open hearth billets, Pittsburgh	19.00	19.00	18.50	23.00
Forging billets, Pittsburgh	**25.00**	24.00	24.00	28.00
Open hearth billets, Philadelphia.	21.40	21.40	21.40	25.50
Wire rods, Pittsburgh	24.50	24.50	25.00	28.00
OLD MATERIAL, Per Gross Ton:				
Iron rails, Chicago	**14.75**	14.50	14.50	15.50
Iron rails, Philadelphia	**16.00**	15.50	15.50	17.00
Car wheels, Chicago	13.00	13.00	12.00	13.50
Car wheels, Philadelphia	12.50	12.50	11.25	13.00
Heavy steel scrap, Pittsburgh	12.25	12.25	12.00	13.50
Heavy steel scrap, Chicago	**10.25**	10.00	9.50	12.00
Heavy steel scrap, Philadelphia.	**12.25**	12.00	11.50	12.50
FINISHED IRON AND STEEL,				
Per Pound to Largest Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia	1.25	1.25	1.20	1.35
Iron bars, Pittsburgh	1.25	1.25	1.20	1.40
Iron bars, Chicago	1.15	1.15	1.15	1.35
Steel bars, Pittsburgh	**1.15**	1.10	1.05	1.40
Steel bars, tidewater, New York.	**1.31**	1.26	1.21	1.56
Tank plates, Pittsburgh	1.15	1.15	1.10	1.40
Tank plates, tidewater, New York	1.31	1.31	1.26	1.56
Beams, Pittsburgh	1.15	1.15	1.10	1.40
Beams, tidewater, New York	1.31	1.31	1.26	1.56
Angles, Pittsburgh	1.15	1.15	1.10	1.40
Angles, tidewater, New York	1.31	1.31	1.26	1.56
Skelp, grooved steel, Pittsburgh	**1.15**	1.12½	1.12½	1.25
Skelp, sheared steel, Pittsburgh	1.20	1.20	1.20	1.30
SHEETS, NAILS AND WIRE:				
Per Pound to Largest Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	1.90	1.90	1.85	2.20
Wire nails, Pittsburgh	1.55	1.55	1.55	1.70
Cut nails, Pittsburgh	1.50	1.50	1.50	1.60
Barb wire, galv., Pittsburgh	1.90	1.90	1.85	2.00
METALS,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	**14.00**	13.75	13.00	13.00
Electrolytic copper, New York.	**13.87½**	13.62½	12.87½	12.75
Spelter, St. Louis	*6.15*	6.25	6.60	5.65
Spelter, New York	*6.30*	6.40	6.75	5.75
Lead, St. Louis	*4.35*	4.37½	4.27½	4.35
Lead, New York	4.45	4.45	4.35	4.50
Tin, New York	**45.00**	44.35	43.35	37.90
Antimony, Hallett, New York	**7.75**	7.60	7.65	7.75
Tin plate, 100-lb. box, New York	$3.64	$3.64	$3.64	$3.84

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb. New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier, 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.15c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in. on thinnest edge	.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates) 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in., and angles, 3 to 6 in. on one or both legs, ¼ in. and over, 1.15c. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in.	1.20 to 1.25
H-beams over 18 in.	1.30 to 1.35
Angles over 6 in.	1.20 to 1.25
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card Sept. 1, 1909	1.20 to 1.25
Tees, 3 in. and up	1.20 to 1.25
Zees, 3 in. and up	1.15 to 1.20
Angles, channels and tees, under 3 in., plus full extras as per steel bar card Sept. 1, 1909	1.20 to 1.25
Deck beams and bulb angles	1.45 to 1.50
Hand rail tees	2.00 to 2.15
Checkered and corrugated plates	2.00 to 2.15

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8	1.30 to 1.35
Nos. 9 and 10	1.40 to 1.45
Nos. 11 and 12	1.45 to 1.50
Nos. 13 and 14	1.50 to 1.55
Nos. 15 and 16	1.60 to 1.65

Box Annealed Sheets, Cold Rolled.

	One Pass.	Three Pass.
Nos. 10 to 12	1.55 to 1.60	.....
Nos. 13 and 14	1.60 to 1.65	.....
Nos. 15 and 16	1.65 to 1.70	1.75 to 1.80
Nos. 17 to 21	1.70 to 1.75	1.80 to 1.85
Nos. 22, 23 and 24	1.75 to 1.80	1.85 to 1.90
Nos. 25 and 26	1.80 to 1.85	1.90 to 1.95
No. 27	1.85 to 1.90	1.95 to 2.00
No. 28	1.90 to 1.95	2.00 to 2.05
No. 29	1.95 to 2.00	2.05 to 2.10
No. 30	2.05 to 2.10	2.15 to 2.20

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11	1.90 to 1.95
Nos. 12, 13 and 14	2.00 to 2.05
Nos. 15, 16 and 17	2.15 to 2.20
Nos. 18 to 22	2.30 to 2.35
Nos. 23 and 24	2.40 to 2.45
Nos. 25 and 26	2.60 to 2.65
No. 27	2.75 to 2.80
No. 28	2.90 to 2.95
No. 29	3.00 to 3.05
No. 30	3.20 to 3.25

All above rates on sheets are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice, as also are the following base prices per square for painted and galvanized roofing sheets, with 2½-in. corrugations:

Corrugated Roofing Sheets, Per Square.

Gauge.	Painted.	Galvanized.	Gauge.	Painted.	Galvanized.
29	....	$2.30	23	$2.35	$3.45
28	$1.30	2.45	22	2.55	3.65
27	1.45	2.50	21	2.75	4.00
26	1.55	2.60	20	3.00	4.30
25	1.80	3.00	18	4.00	5.65
24	2.05	3.10	16	4.85	6.45

Wire Rods and Wire.—Bessemer, open-hearth and chain rods, $24.50. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, $1.35; galvanized, $1.65. Carload lots, to retailers, annealed, $1.45; galvanized, $1.75. Galvanized barb wire to jobbers, $1.85; painted, $1.55. Wire nails, to jobbers, $1.55.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 Lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.50	$1.55	$1.60	$1.65	$1.75	$1.85	$1.95	$2.05
Galvanized	1.80	1.85	1.90	1.95	2.05	2.15	2.55	2.65

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from December 1, 1911:

	Steel		Iron	
	Black.	Galv.	Black.	Galv.
Butt Weld.				
⅛ and ¼ in.	74	54	68	48
⅜ in.	75	65	69	59
½ in.	78	68	72	62
¾ to 1¼ in.	81	73	75	67
2 to 3 in.	82	75	76	69
Lap Weld.				
1¼ and 1½ in.	..	..	68	61
2 in.	79	72	72	65
2½ to 4 in.	81	74	74	67
4½ to 6 in.	80	72	73	65
7 to 12 in.	78	68	71	61
13 to 15 in.	55	..	47	..
Butt Weld, extra strong, plain ends, card weight.				
⅛, ¼, ⅜ in.	70	60	65	55
½ in.	75	69	70	64
¾ to 1¼ in.	79	73	74	68
2 to 3 in.	80	74	75	69
Lap Weld, extra strong, plain ends, card weight.				
1½ in.	..	..	66	60
2 in.	76	70	71	65
2½ to 4 in.	78	72	73	67
4½ to 6 in.	77	71	72	66
7 to 8 in.	70	60	65	55
9 to 12 in.	65	55	60	50
Butt Weld, double extra strong, plain ends, card weight.				
½ in.	65	59	60	54
¾ to 1¼ in.	68	62	63	57
2 to 3 in.	70	64	65	59
Lap Weld, double extra strong, plain ends, card weight.				
2 in.	66	60	61	55
2½ to 4 in.	68	62	63	57
4½ to 6 in.	67	61	62	56
7 to 8 in.	60	50	55	45

Plugged and Reamed.

1 to 1½, 2 to 3 in. Butt Weld
2, 2½ to 4 in. Lap Weld

} Will be sold at two (2) points lower basing (higher price) than merchants' or card weight pipe. Butt or lap weld as specified.

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

Steel.		*Charcoal Iron.*	
1¾ to 2¼ in.	65	1½ in.	48
2½ in.	67½	1¾ to 2¼ in.	50
2¾ to 3¼ in.	72½	2½ in.	55
3½ to 4 in.	75	2¾ to 5 in.	60
5 to 6 in.	67½		
7 to 13 in.	65		

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discounts, lowered by two points.

Pittsburgh

PITTSBURGH, PA., December 20, 1911.—*(By Telegraph.)*

Pig Iron.—The purchase of 25,000 tons of standard Bessemer iron by the Youngstown Sheet & Tube Company from the Ohio Iron & Steel Company, Lowellville, Ohio, for January to March delivery, at $14.25, Valley, which includes a sale of a large tonnage of basic ore by the former to the latter, has had the effect of strengthening the market on Bessemer iron, and all the Valley furnaces are now quoting $14.25 at furnace. This transaction should not be considered strictly as a conversion deal, as such was not the case. There is a heavy inquiry for basic, foundry and malleable Bessemer iron, and large tonnages have been sold for first quarter delivery. The Pittsburgh Steel Company is in the market for 600 to 800 tons of basic iron per day, running over the first half of next year. Since July 1 it has been taking its entire requirements of basic pig iron from one producing interest, but the contract expires December 31, so that the company will probably be a large buyer of basic pig iron in the open market. The Westinghouse Machine Company is in the market for 1000 tons or more of foundry iron for first quarter, but will probably buy a much larger tonnage. A sale of about 7000 tons of Bessemer iron was made last week to a local consumer for first half at $14, Valley furnace. A dealer reports a sale of 2000 tons of Bessemer for delivery in the Cleveland district at $14.25, Valley furnace. We quote: Bessemer iron, $14.25; basic, $12.25 to $12.50; malleable Bessemer, $12.75; No. 2 foundry, $13 to $13.25; gray forge, $12.50 to $12.75, all at Valley furnace, the freight rate to Pittsburgh being 90c. a ton.

Billets and Sheet Bars.—Prices on both open-hearth and Bessemer are firmer, and mills report inquiries heavier. A leading maker of billets and sheet bars is practically out of the market on sheet bars for the first half of next year. The Carnegie Steel Company has made contracts with sheet and tin plate mills for a very heavy tonnage of bars for first quarter. Specifications against contracts for billets and sheet and tin bars are heavier this month than in November, and shipments will be much larger. We quote: Open-hearth and Bessemer billets, $19 to $19.50; open-hearth sheet bars, $20 to $20.50; Bessemer sheet bars, $20.50 to $21; forging billets, $25 to $26, Pittsburgh or Youngstown.

(By Mail.)

The committee of Mahoning and Shenango Valley iron makers which appeared before the officials of the railroad systems covering the Pittsburgh and Valley districts, with a request for lower rates of freight on ore and coke, has been advised by these officials that its request will not be granted. James A. Campbell, chairman of this committee, states that the case will now be taken before the Interstate Commerce Commission and a determined effort will be made to secure reduced rates on ore, coke, pig iron and other products. Reports of a reduction of 50c. per ton in prices of ore for next year are not confirmed. The new demand for finished iron and steel is heavier and prices are strong and in some cases higher. Unless prices are advanced too rapidly, thus shutting off the demand to some extent, the volume of new business for the first half of next year should be quite heavy. In fact, most of the leading steel interests are pretty well booked up on their products for such delivery, most of this business having been taken at the very low prices ruling three or four weeks ago.

Ferromanganese.—Numerous small sales, ranging from 50 to 200 tons, aggregating about 600 tons, have been made of standard English 80 per cent. at $38.50, Baltimore, but the price has since been advanced to $41. The freight rate for delivery in the Pittsburgh district is $1.95 a ton.

Ferrosilicon.—The Carnegie Steel Company, which put out an inquiry several weeks ago for 6000 tons of 50 per cent., for delivery over all of 1912, has not yet bought any, despite reports that it has done so. The market is very strong, and the minimum price of 50 per cent. is $70, Pittsburgh, sales of three or four cars, or about 100 tons, for prompt delivery, being reported at this price. We quote 10 per cent. at $21; 11 per cent., $22, and 12 per cent., $23, f.o.b. cars at furnace, Jackson, Ohio, or Ashland, Ky.

Muck Bar.—Prices are stronger, and best grades made from all pig iron are now quoted at $28 to $28.50, Pittsburgh. The A. M. Byers Company has started up 66 of its 88 puddling furnaces at Girard, Ohio, which had been shut down for some time by a labor dispute, and the others will be started as soon as puddlers can be obtained to operate them. The Wheeling Steel & Iron Company has started up 24 puddling furnaces at Wheeling, W. Va.

Skelp.—There is more inquiry for grooved steel plates and sheared iron plates than for some time, and the mills are pretty well filled up for the next two months. Prices are strong and slightly higher. We quote grooved steel skelp at 1.15c. to 1.17½c.; sheared steel skelp, 1.20c. to 1.22½c.; grooved iron skelp, 1.42c. to 1.45c., and sheared iron skelp, 1.62½c. to 1.65c., all for delivery at buyer's mills in the Pittsburgh district.

Wire Rods.—The market on wire rods continues dull and prices, while stronger, are not higher. Consumers are covered by contracts but are not specifying very freely. We quote Bessemer, open-hearth and chain rods at $24.50 to $25, Pittsburgh.

Steel Rails.—On December 16 the three Edgar Thomson rail mills of the Carnegie Steel Company were shut down for usual annual repairs, but will be started again January 2. No definite information has been received here as to reported large contracts for rails for 1912 delivery. In the past week the Carnegie Company received new orders and specifications for about 3500 tons of light rails, inquiries from the coal mining companies being quite heavy. We quote standard sections at 1.25c. per lb.; 8 and 10-lb. light rails, 1.25c.; 12 and

14-lb., 1.16c.; 16, 20 and 25-lb., 1.12c.; 30 and 35-lb., 1.10c., and 40 and 45-lb., 1.08c., f.o.b. at mill.

Structural Material.—Inquiries have quieted down somewhat, but there is still a good deal of new work under way. The McClintic-Marshall Construction Company has taken 3500 tons for New York Central work in New York City and the American Bridge Company about 500 tons for new buildings for the Armstrong Cork Company, Lancaster, Pa., and about 800 tons for new buildings at Norfolk, Va. The Henry Shenk Company, Pittsburgh and Erie, Pa., has placed 900 tons with the Buffalo Structural Steel Company, Buffalo, N. Y., for the new Lawrence Hotel at Erie, Pa. While the mills are quoting higher prices on plain material, it is stated that large jobs are being taken at as low prices as have ruled at any time in some months. The two leading mills are now holding plain material at 1.15c. minimum on the very largest orders and 1.20c. on smaller business. We quote beams and channels up to 15 in. at 1.15c. to 1.20c., at mill, Pittsburgh.

Plates.—There has been a lull in the placing of new car orders. The report that the Pennsylvania Railroad has sent out inquiries for 40,000 to 50,000 steel cars is untrue. As stated last week, it is inquiring for prices on 1000 to 2000 70-ton truck cars, of three different types, and if the prices named are satisfactory it may buy 20,000 to 30,000. The Cambria Steel Company has received an order for 300 all-steel coal cars from the Berwind-White Coal Company. The Chicago & Northwestern has ordered 600 automobile cars from the Western Car & Foundry Company and 500 flat cars from the Standard Steel Car Company. The Missouri Pacific has placed contracts for 2000 gondola and box cars, the Minneapolis & Sault Ste. Marie 750 steel underframe box cars and the Norfolk & Southern 500 box cars, all with the American Car & Foundry Company. Operations among the plate mills are heavier and they have a fair amount of work ahead, mostly from steel car companies. The city of Quebec may decide to use cast iron pipe for its new water line, but if riveted pipe is used it will require about 12,000 tons. We quote narrow and wide plates at 1.15c. to 1.20c., f.o.b. at maker's mill.

Sheets.—Some of the leading independent sheet and tin plate mills have been holding meetings in Pittsburgh with the object of forming an association along the lines of the National Hardware Association. Strong efforts will be made to put conditions in these lines on a better basis, but it is claimed that no attempt will be undertaken to control prices. The sheet trade is very much improved, the demand being heavy and specifications against contracts coming in at a satisfactory rate. The leading mills are well filled through the first quarter and have sold a good deal into second quarter. Their operations are on a heavier basis and it is said that prices are being well maintained at 1.40c. for Nos. 9 and 10 blue annealed sheets, 1.90c. for No. 28 black and 2.90c. for No. 28 galvanized in carload and larger lots, f.o.b. maker's mill.

Tin Plate.—The report that the American Sheet & Tin Plate Company would add three hot sheet mills to its works at Chester, W. Va., and would change some of the present tin mills to sheet mills is officially denied. The company is now operating all of the 30 hot mills in its Shenango Works at New Castle, Pa., the 20 hot mills in its New Castle Works at the same place, all of the 25 hot mills in its National Works at Monessen, Pa., and has started 5 of the 10 hot mills at its works at Sabraton, W. Va. The Pope Tin Plate Company is operating its 12 hot mills full time and the McKeesport Tin Plate Company is running all of its 22 hot mills. Operations among the leading mills are now on the basis of about 70 per cent., being an increase of fully 20 per cent. in the last two months. They have booked an enormous amount of business for delivery through the first half and in some cases through all of next year. The regular price of tin plate remains at $3.40 per base box for 14 x 20 coke plates, and it is said that this price is being better observed. We quote $3.40 per base box for 14 x 20 coke plates, f.o.b. at mill.

Bars.—New orders and specifications for steel bars continue heavy. Leading makers are now quoting 1.15c. for prompt shipment or through the first quarter, and one of them is reported to be holding at 1.20c. for first quarter. The new demand and specifications for iron bars are also reported to be better and prices are firmer. We quote steel bars at 1.15c., for delivery through the first quarter, and common iron bars at 1.25c. to 1.30c., maker's mill.

Hoops and Bands.—Prices are firmer, with new orders and specifications coming in at a heavier rate than for some time. We quote bands at 1.15c., for delivery through first half, and hoops at 1.25c. to 1.30c., maker's mill, Pittsburgh.

Railroad Spikes.—The very low prices ruling on spikes and the advancing tendency on other products have caused the railroads to come in the market with a rush to cover their requirements. In the past week the Pennsylvania, Baltimore & Ohio, Norfolk & Western and others have placed contracts for first half delivery for fully 75,000 kegs, and specifications have come in from other roads for 10,000 to 15,000 kegs. These contracts were placed on the basis of $1.40 per 100 lb. for base sizes, and the leading makers are now pretty well filled through the first half. We quote railroad spikes at $1.40 base, in standard sizes in carload and larger lots, f.o.b. Pittsburgh.

Rivets.—New orders and specifications on contracts for both boiler and structural rivets are reported better and prices are stronger. We quote structural rivets at 1.40c. to 1.45c. and boiler rivets at 1.50c. to 1.55c. for large lots, f.o.b. cars, Pittsburgh.

Shafting.—Implement makers and automobile builders are specifying more liberally against contracts and the new demand is also reported heavier. We quote cold rolled shafting at 65 per cent. off in carload and larger lots and 60 and 5 per cent. off in small lots, delivered in base territory.

Spelter.—The market has firmed up slightly and prime grades of Western are now held at about 6.15c., East St. Louis, equal to 6.27½c., Pittsburgh.

Wire Products.—The new demand for wire and wire nails is larger and specifications against contracts are also coming in more freely. Mills report that the higher prices on nails and wire, which went into effect December 11, are being firmly held. We quote: Wire nails, $1.55; cut nails, $1.50; galvanized barb wire, $1.85; painted, $1.55; annealed fence wire, $1.35; galvanized fence wire, $1.65, f.o.b. Pittsburgh, usual terms, freight added to point of delivery.

Merchant Pipe.—Leading pipe mills are now operating to about 75 per cent. of capacity. The new demand for merchant pipe so far this month has been heavier than in the same period in November. The order of the Southern Gas Company of California for 150 miles of 12-in. line pipe has not yet been placed. Mills state that the new discounts on steel pipe which went into effect December 1 are well held, being shaded only in a few cases.

Tubes.—A local maker reports having entered some large contracts for locomotive tubes in the past week and there is a good deal of new inquiry. The demand for merchant tubes is quiet, being mostly in small lots to cover actual needs. Some low prices continue to be made on both locomotive and merchant tubes.

Iron and Steel Scrap.—The demand for scrap from consumers is reported heavier and prices are stronger. Dealers who have scrap in their yards are not inclined to sell it at present prices. Heavy steel scrap, bundled sheet scrap and borings and turnings are very firm. A number of contracts have been made in the past week or two between makers and dealers on bundled sheet and tin scrap and it is reported that slightly higher prices than ruled in the summer months have been paid. Dealers quote as follows, per gross ton, f.o.b. Pittsburgh, unless otherwise noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery	$12.25 to $12.75
No. 1 foundry cast	11.75 to 12.00
No. 2 foundry cast	10.75 to 11.00
Bundled sheet scrap, f.o.b. consumers' mill, Pittsburgh district	10.25 to 10.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	12.50 to 12.75
No. 1 railroad malleable stock	11.25 to 11.50
Grate bars	9.00 to 9.25
Low phosphorus melting stock	15.25 to 15.50
Iron car axles	20.50 to 21.00
Steel car axles	16.00 to 16.25
Locomotive axles	22.00 to 22.50
No. 1 busheling scrap	11.00 to 11.25
No. 2 busheling scrap	7.00 to 7.25
Old car wheels	12.00 to 12.25
*Cast iron borings	8.75 to 9.00
*Machine shop turnings	9.00 to 9.25
†Sheet bar crop ends	13.75 to 14.00
Old iron rails	14.50 to 14.75
No. 1 wrought scrap	12.00 to 12.25
Heavy steel axle turnings	9.75 to 10.00
Stove plate	9.00 to 9.25

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
†Shipping point.

Coke.—Negotiations which have been on for a week or more for large lots of furnace coke for shipment over the first half have not yet been closed. The coke trade is better, the output and shipments showing slight gains, while prices, especially on furnace coke for spot shipment, are higher. Owing to the shortage of labor in the coke regions, the stocks of coke that

were piled up several months ago have been pretty well cleaned up, and spot furnace coke is scarcer and higher. We note sales of about 5000 tons of standard furnace coke for spot shipment at $1.60 at oven, while several other sales, one of 2000 tons, are reported at $1.65. There is a fairly active demand for foundry coke, some consumers not yet having covered their requirements for the first half. The output in the Upper and Lower Connellsville region last week showed an increase over the previous week of about 12,000 tons. We quote best grades of furnace coke for prompt shipment at $1.60 and for first half of 1912 at $1.65 to $1.70 per net ton at oven; best makes of 72-hr. foundry coke for spot shipment at $1.90 to $2 and for first half of next year at $2.10 to $2.25 per net ton at oven to consumers. Some makes of furnace and foundry coke not running as high in quality are obtainable at slightly lower prices.

Chicago

CHICAGO, ILL., December 20, 1911.—(*By Telegraph.*)

Pig Iron.—The tonnage of the pig iron business under consideration and closed in this territory has continued large, but at this writing evidences are appearing that the buying movement is waning. The fact that prices for both Northern and Southern iron have failed to show material advances and that quotations for full first half delivery are on the same basis as obtained at the beginning of the buying movement tends to support the belief that the tonnage purchased has not been so heavy as the trade had been led to believe. Some of the Southern interests still display eagerness to obtain orders on the basis of $10, Birmingham, to the extent that attractive analysis offers are still being made. Other interests are sold up to a greater extent for first quarter delivery and are asking an advance for second quarter shipment. For local iron the price is still $14 at the furnace, and the idle capacity is a restraining influence as regards a higher market. We quote for Chicago delivery, except for local irons, which are f.o.b. furnace, the following prices on prompt shipments:

Lake Superior charcoal	$16.50 to $17.00
Northern coke foundry, No. 1	14.50 to 15.00
Northern coke foundry, No. 2	14.00 to 14.50
Northern coke foundry, No. 3	13.50 to 14.00
Northern Scotch, No. 1	16.00
Southern coke, No. 1 foundry and No. 1 soft	14.85
Southern coke, No. 2 foundry and No. 2 soft	14.35
Southern coke, No. 3	14.10 to 14.35
Southern coke, No. 4	13.85 to 14.10
Southern gray forge	13.60 to 13.85
Southern mottled	13.60 to 13.85
Malleable Bessemer	14.35 to 14.50
Standard Bessemer	16.75
Basic	14.75
Jackson County and Kentucky silvery, 6 per cent.	16.40
Jackson County and Kentucky silvery, 8 per cent.	17.40
Jackson County and Kentucky silvery, 10 per cent.	18.40

(By Mail.)

The market shows an upward trend as regards finished steel products and old material, based on the substantial tonnages purchased. The attitude of buyers is now entirely changed from one of reluctance to take on any more material than is absolutely necessary to a decided interest in covering for the next six months' requirements. The question is no longer whether the market has turned but to what extent the requirements of the first half year should be engaged, as complete assurance of the continued advance in prices is not yet established. In the Northwest, one railroad is understood to have closed for 30,000 tons of rails and a parallel system is about to place its orders for an aggregate of 40,000 tons. Car buying from the West has slackened somewhat, purchases in the week aggregating about 2000, the Chicago & Northwestern and the Illinois Central being the principal buyers. The decidedly firmer attitude taken by Pittsburgh makers on prices for plates, structural shapes and bars has not been exactly paralleled in this market although prices of all are moving upward. Business in bars and plates, both specifications and new orders, continues to come in heavily but the demand for structural material is only moderate. A marked improvement in sheet tonnage was apparent during the week. The advance in wire products brought in a large proportion of buyers who hasfened to cover at the low price. In the past week the advancing market for scrap has been supported by general and extensive buying on the part of the melters.

Track Supplies and Railroad Equipment.—The Northern Pacific Railroad, whose inquiry for rails has been up for some time, is understood to have placed an order for 20,000 tons with the Colorado mill and to have divided 10,000 tons between a Chicago and a Buffalo maker. The Great Northern Railroad at this writing is on the eve of closing for 40,000 tons. The demand for track fastenings is light and prices are far from firm. The largest car order of the week was for 750 for the Chicago & Northwestern Railway to be built by the Pullman Company and 500 for the Illinois Central Railroad to be built by the American Car & Foundry Company. This last company also took orders for about 500 cars of miscellaneous description. We quote standard railroad spikes at 1.50c., base; track bolts, with square nuts, 1.90c., base, all in carload lots, Chicago; standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c.; angle bars, 1.50c., Chicago.

Structural Material—The rate of booking by the mills has fallen somewhat behind that of other finished materials This is particularly true of architectural shapes. Local fabricators, with possibly one exception, are in a position to accept business promptly. The American Bridge Company will furnish 1500 tons for two apartment buildings in Chicago to be built for Benjamin H. Marshall, and also 275 tons of transmission towers for the Great Northern Power Company. at Duluth. The McClintic-Marshall Construction Company was awarded 497 tons for an extension to the plant of the American Car & Foundry Company and the St. Paul Foundry Company will fabricate 400 tons for a factory building at St. Paul to be erected by Griggs-Cooper & Co. We quote for mill shipment, Chicago, 1.30c. to 1.35c. and from store 1.60c.

Plates.—Plate business on the mill books continues to mount up in this market as in the East, but the competitive situation here continues to prevent as marked advances in prices as are reported from Eastern points. For mill shipment, depending upon the desirability of the order, quotations range from 1.30c. to 1.38c., delivered, Chicago, applying on material to be shipped in from three to six months. Buyers are disposed to cover for six months to a limited extent, but a strong feeling still remains that no marked increase in prices will be established in the first half of the year. We quote for Chicago delivery, mill shipment, prompt, 1.30c. to 1.35c., and for delivery through the first half 1.38c. From store we quote 1.60c.

Sheets.—Sheets, which have been one of the weakest departments of the market, have shown a marked improvement in the past week. Orders have increased and prices are much firmer. We quote Chicago prices as follows: Carload lots, from mill, No. 28 black sheets, 2.03c. to 2.08c.; No. 28 galvanized, 3.03c. to 3.08c.; No. 10 blue annealed, 1.53c. to 1.58c. Prices from store, Chicago, are: No. 10, 1.90c.; No. 12, 1.95c.; No. 28 black, 2.30c.; No. 28 galvanized, 3.35c.

Bars.—Both specifications on contracts and new orders for steel bars are being booked by the mills in large volume. Eastern makers are now asking 1.15c., Pittsburgh, for delivery at Chicago, but the local market has not yet advanced to that basis and business is being placed at between 1.25c. and 1.30c. Iron rolling mills also have assumed a firmer position and bar iron is strong at 1.15c., Chicago. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.23c. to 1.33c.; bar iron, 1.15c. to 1.20c.; hard steel bars rolled from old rails, 1.15c. to 1.20c. From store: Soft steel bars, 1.50c. to 1.55c., Chicago.

Wire Products.—The recent advance of $1 a ton in wire products resulted in a sharp increase in buying as usual. Dealers, whose stocks of wire and nails have been very small, have hastened to protect themselves on the basis of the low price. Fence wire has not shared to any extent in this activity. We quote: Plain wire, No. 9 and coarser, base, $1.53; wire nails, $1.73; painted barb wire, $1.73 to $1.78; galvanized, $2.03 to $2.08; polished staples, $1.78 to $1.83; galvanized, $2.08 to $2.13, all Chicago.

Cast Iron Pipe.—The tonnage of pipe being considered by a number of cities and gas companies is assuming large proportions. The purchases immediately following the first of the year are being anticipated with decided interest. At Portland, Ore., bids have been taken on 12,000 tons and at San Diego, Cal., between 500 and 600 tons has been awarded to the United States Cast Iron Pipe & Foundry Company. We quote as follows, per net ton, Chicago: Water pipe, 4-in., $26.50; 6 to 12-in., $24.50; 16-in. and up, $24, with $1 extra for gas pipe.

Old Materials.—The support which the advancing scrap market has lacked prior to this week has now been supplied in the extended and liberal buying by

melters. A general advance of 25c. a ton on all grades is recorded this week, with consumers quite willing to buy, while those holding material are inclined to part with it only in small quantities and at an advance. Rolling mill scrap, which has been in little demand for some time, is being sought in fair volume. Foundry grades continue strong and local buyers of railroad malleable are taking all that is offered. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, per gross ton, as follows:

Old iron rails	$14.75 to $15.25
Old steel rails, rerolling	12.50 to 13.00
Old steel rails, less than 3 ft	11.00 to 11.50
Relaying rails, standard section, subject to inspection	24.00
Old car wheels	13.00 to 13.50
Heavy melting steel scrap	10.25 to 10.75
Frogs, switches and guards, cut apart	10.25 to 10.75
Shoveling steel	9.75 to 10.25
Steel axle turnings	8.25 to 8.75

The following quotations are per net ton:

Iron angles and splice bars	$12.50 to $13.00
Iron arch bars and transoms	13.50 to 14.00
Steel angle bars	9.50 to 10.00
Iron car axles	17.25 to 17.75
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	10.75 to 11.25
No. 2 railroad wrought	9.75 to 10.25
Steel knuckles and couplers	9.75 to 10.25
Steel springs	10.00 to 10.50
Locomotive tires, smooth	13.25 to 13.75
Machine shop turnings	6.25 to 6.75
Cast and mixed borings	5.50 to 6.00
No. 1 busheling	8.50 to 9.00
No. 2 busheling	6.00 to 6.50
No. 1 boilers, cut to sheets and rings	6.75 to 7.25
Boiler punchings	12.50 to 13.00
No. 1 cast scrap	10.75 to 11.25
Stove plate and light cast scrap	9.00 to 9.50
Railroad malleable	10.25 to 10.75
Agricultural malleable	8.75 to 9.25
Pipes and flues	7.75 to 8.25

Philadelphia

PHILADELPHIA, PA., December 19, 1911.

The bulk of the business transacted during the week has been in small and moderate sized lots, although some good negotiations, both in crude and finished materials, are in progress. The movement in pig iron has been confined to foundry grades. Eastern plate and structural mills still refuse, as a rule, to accept forward business at minimum quotation. Iron bars are firm, while 1.30c., delivered, is becoming more general for steel bars for forward shipment. More interest in billets is noted. The old material market is decidedly stronger, higher prices being obtained in a number of grades. A sale of 7000 tons of cast scrap, unbroken tunnel plate sections, is reported. Furnace coke is decidedly more active, several contracts for 1912 shipment having been closed and others covering fully 160,000 tons are pending. The quotation for 80 per cent. ferromanganese, for next year's delivery, has been advanced to $41, Baltimore.

Iron Ore.—Little business is moving either in foreign or domestic grades, both buyers and sellers awaiting developments in the pig iron market. Importations during the week included 5785 tons from Sweden, 6304 from Spain, 6450 from Newfoundland and 4800 from Cuba. The aggregate amount of ore imported through this port in 1911 will be close to 1,000,000 tons, somewhat less than was imported in 1910.

Pig Iron.—Consumers are coming into the market freely for foundry grades for near as well as forward requirements, and although there has been but little large lot buying the aggregate volume of business has been satisfactory, particularly when the season is taken into consideration. Several producers have taken on about all the business wanted at present prices. The question of blowing in some of the idle furnaces is being seriously contemplated by some producers. Sheridan and Carbon are expected to blow in, while consideration is being given to the blowing in of Saxton in Pennsylvania and Princess in Virginia. On the other hand, it is stated that the Thomas Iron Company has ordered Hellertown and Alburtis to be blown out. At least two producers in this district are now holding firmly at $15.25, delivered, for No. 2 X foundry, but the general market ranges from $14.85 to $15.10. Sales recently have been mostly in lots up to 300 tons, with an occasional 500 tons and a few of 1000 tons, the larger quantities covering, as a rule, deliveries over first quarter or first half. Negotiations are pending for several 1000-ton lots, both No. 2 X and No. 2 plain. The cast iron pipe makers are again showing more interest in the market, a sale of 1000 tons of low grade iron at $13.85, furnace, being reported, the freight on which will be about 10 to 15 cents a ton. One Delaware interest is inquiring for 5000 tons, half No. 3 and half foundry forge, for March shipment, while another will take on several thousand tons if satisfactory prices can be made. Moderate sales of Southern No. 2 foundry have been made in this district at $10, Birmingham. Sales of Virginia foundry iron have been moderately active. One sale of 1000 tons for New England delivery, shipment over the next five months, has been made at $12.50, furnace. For first quarter delivery Virginia No. 2 X is available at $12.25 to $12.50, furnace. Little inquiry for rolling mill forge iron is noted. Small sales of Lehigh Valley malleable have been made at about $15.50, delivered here. The steel making grades are quiet; no important inquiry for basic has developed, while the recent heavy movement in low phosphorus iron has about come to an end. The following range of quotations is named for standard brands, delivered in buyers' yards in this district, during the first quarter and half:

Eastern Pennsylvania No. 2 X foundry	$14.85 to $15.25
Eastern Pennsylvania No. 2 plain	14.60 to 15.00
Virginia foundry	15.00 to 15.50
Gray forge	14.25
Basic	14.25 to 14.50
Standard low phosphorus	19.25 to 19.50

Ferroalloys.—While small sales of 80 per cent. ferromanganese were made last week at $38.50, Baltimore, this price has been withdrawn by foreign producers. In one instance a firm offer for 1200 tons at that figure was refused. Importers now quote $41, Baltimore. An inquiry for 75 tons of 50 per cent. ferrosilicon is reported. It continues to be quoted at $70, delivered. The demand for 10 to 12 per cent. ferrosilicon has been unimportant.

Billets.—Considerable effort is being made by consumers to place contracts covering a supply of rolling billets for extended delivery. Inquiries are out for lots running up to several thousand tons, but mills are not disposed to accept forward business at to-day's inside quotation, which is $21.40, delivered, for basic open-hearth rolling billets, although some fair business for early shipment has been placed on that basis. For extended delivery mills are holding at $22.40, delivered. A fair business in forging billets is being offered, but sales have not been heavy. Ordinary forging billets are quoted at $26.40 to $27.40, delivered here.

Plates.—The volume of orders has been somewhat larger, as Eastern mills are now accepting contracts on which deliveries run through the first quarter of the year, business of this character having been taken in some instances at 1.35c., delivered. Consumers would place contracts for even more extended shipment if mills would accept. A large amount of business is under consideration, including an inquiry for 3500 tons, covering both plates and shapes, from one of the local ship builders. A very fair run of miscellaneous orders for prompt shipment is noted, but not sufficiently large to enable mills to increase their productive rate. Quotations cover a rather wide range; 1.30c. is still done on desirable business, while for miscellaneous orders 1.35c. to 1.40c., delivered, is now generally named.

Structural Material.—Fabricators in this district have not taken on any important new contracts, although some good business is pending. The Baldwin Locomotive Works has decided to go ahead with its addition to its Eddystone erecting shop and will place orders in a few days for the structural work, requiring about 4500 tons. The contract for the Stock Exchange Building has not yet been placed. Very little bridge work is before local builders. Estimates are going in on several small buildings, while plans for some larger propositions are under way. Plain shapes are in fair demand, being quoted at 1.30c. to 1.35c., delivered in this vicinity.

Sheets.—A very fair business has been done. Eastern mills are operating at full capacity and are being rushed for deliveries prior to the usual holiday suspension of operations. Consumers are making strong efforts to place contracts for extended shipment at present prices, but Eastern mills refuse to accept such business. Prices are firm at 2.05c., delivered here, for Western sheets, although Eastern mills making smooth loose rolled sheets obtain ¼c. to ½c. per lb. advance.

Bars.—The market has a much firmer appearance. Buying has been a shade more active and sellers refuse to make concessions. Iron bars in round lots have been sold by some makers for delivery over several months at 1.17½c., mill, equal to 1.25c., delivered here, although others are holding firmly at 1.20c., mill, or 1.27½c., here, as a minimum for ordinary business. Steel bars are more generally on a 1.25c., delivered, basis with 1.30c. asked for forward deliveries.

Coke.—Sharp activity in furnace coke for delivery over the first half and even the entire coming year is now being experienced. Several furnaces have closed for a good portion of their requirements for 1912, while fully 160,000 tons are under negotiation. Producers endeavor to obtain $1.75 at oven for extended shipment, but business has been put through at $1.65. Small lot business has been moving in foundry coke at unchanged prices, although deliveries on contract are being freely made. Prices show practically no change, the following range, per net ton, being quoted for deliveries in this vicinity:

Connellsville furnace coke	$3.65 to $4.05
Foundry coke	4.15 to 4.50
Mountain furnace coke	3.40 to 3.65
Foundry coke	3.95 to 4.40

Old Material.—More interest is being shown in nearly all grades of scrap. Mills are becoming more alive to the situation, although in certain grades a dealers' market largely prevails. Material on the railroad lists went at considerably higher prices, $12.75 having been paid, it is reported, for No. 1 heavy melting steel. One Eastern mill bought 1000 tons of prime No. 1 heavy melting steel at $12.50, delivered, also small odd lots at lower prices. A fair movement in rolling mill grades is reported. Small lots of iron axles have been sold at $22, delivered. Sales aggregating 7000 tons of cast tunnel plate sections, at a trifle under $13, delivered, are announced. These will have to be broken to chargeable size by the purchaser. The market generally appears stronger, with advances in quite a few grades. The following range of prices about represents quotations at which the ordinary current business for prompt shipment can be done for delivery in buyers' yards, eastern Pennsylvania and nearby points, taking a freight rate from Philadelphia varying from 35c. to $1.35 per gross ton, for shipment ranging from prompt to the remainder of the year:

No. 1 heavy melting steel scrap	$12.25 to $12.75
Old steel rails, rerolling (nominal)	14.00 to 14.50
Low phosphorus heavy melting steel scrap	15.50 to 16.00
Old steel axles	17.50 to 18.00
Old iron axles	22.00 to 23.00
Old iron rails	16.00 to 17.00
Old car wheels	12.50 to 13.00
No. 1 railroad wrought	15.50 to 16.00
Wrought iron pipe	11.75 to 12.25
No. 1 forge fire	10.25 to 10.75
No. 2 light iron (nominal)	6.75 to 7.25
Wrought turnings	9.00 to 9.50
Cast borings	8.25 to 8.75
Machinery cast	13.25 to 13.75
Railroad malleable (nominal)	11.75 to 12.25
Grate bars, railroad (nominal)	10.00 to 10.50
Stove plate	10.25 to 10.75

Cleveland

CLEVELAND, OHIO, December 19, 1911.

Iron Ore.—Ore sellers are finding satisfaction in the figures of the estimated tonnage on the docks May 1, 1912, and the recent improved condition of the pig iron market further encourages them in the belief that ore shipments will be considerably heavier in 1912 than in the present year. The amount of ore on docks and in furnace yards December 1 is estimated at 33,821,000 tons, as compared with 34,376,000 tons a year ago. While this is a reduction of only slightly over 500,000 tons the consumption from December 1 to May 1 will be considerably heavier than during the corresponding period of 1910-11. Reports are circulated from time to time about the readjustment of ore prices for the coming season at a lower basis, but these reports so far are nothing but guesses and are misleading. Ore sellers themselves do not know what they will do about prices for 1912 and are not likely to come to any decision on the matter for some time. One furnaceman who has been trying to feel out the market for prices is understood to have received no satisfaction. Out of the total ore movement of 32,130,411 tons by water in 1911, the receipts at Lake Erie docks were 25,531,550 tons. We quote prices as follows: Old range Bessemer, $4.50; Mesaba Bessemer, $4.25; old range non-Bessemer, $3.70; Mesaba non-Bessemer, $3.50.

Pig Iron.—The demand for foundry grades in lots of 500 tons and under continues fairly active although sales in this immediate territory the past week were light. Some new inquiry from northern Ohio, however, has developed. Some of the furnace companies having two stacks, with only one in operation, have the output of the active furnace sold up for the first half and do not care to take on tonnage that will necessitate the blowing in of the second stack except at quite an advance in prices over current quotations. The conditions of the trade lead furnacemen to believe that prices will shortly be somewhat better. The market on foundry grades as a whole is firm. One Valley interest is now holding No. 2 at $13.25 for the first half and another Valley producer is so well sold out that it has withdrawn from the market for the first quarter and has advanced its price to $13.25 for No. 2 for the second quarter. For Cleveland delivery local furnaces are firmly adhering to $13.25 delivered for No. 2. Low quotations, however, are still made for shipments from Cleveland to outside points, the price depending upon the location. An Erie, Pa., boiler concern has bought 500 tons of No. 2 foundry, one-half of which went to Cleveland furnaces, at $12.50 at furnace. Some consumers are trying to take advantage of present low prices to cover their entire year's requirements but it is doubtful whether any maker will sell for delivery beyond July 1. We note the sale of 800 tons of No. 2 foundry to a local foundry for the first half. An Ohio engine builder is in the market for 800 tons of Nos. 2 and 3. About 2000 tons of No. 3 is wanted for an Ohio pipe plant. A Toronto, Ontario, pipe company that sent out an inquiry two weeks ago for 4000 tons of analysis iron for first half delivery has not yet bought but has increased its inquiry to 5000 tons. A large malleable interest is figuring on the purchase of a round tonnage of malleable iron. We quote as follows for prompt shipment and for the first half, delivered Cleveland:

Bessemer	$14.90 to $15.15
Basic	13.25
Northern foundry, No. 2	13.25
Southern foundry, No. 2	14.35
Gray forge	12.50
Jackson County silvery, 8 per cent. silicon	17.05

Coke.—The local coke market is quiet. Many consumers have not covered for their first half requirements in foundry coke, but will probably follow their present policy of buying in small lots for spot shipment. We quote standard Connellsville furnace coke at $1.60 per net ton, at oven, for spot shipment and $1.65 to $1.70 for first half. Standard Connellsville foundry coke is held at $2 to $2.15 for spot shipment and $2.15 to $2.40 for contract.

Finished Iron and Steel.—The general condition of the local market is regarded as very satisfactory by mill agencies. While orders are not so plentiful since the advance in prices, some business is coming out at the advance and good specifications are being received on contracts. The market is generally firm. On steel bars the minimum quotation is now 1.15c., Pittsburgh, this price being for spot shipment and first quarter delivery. One producer is quoting 1.20c. for the second quarter. Plates are firmer. While the quotation of 1.15c. is still being made, most mills are asking 1.20c. for prompt shipment and first quarter. Mills are quoting structural material at 1.20c. for immediate and first quarter delivery, and it is doubtful if much tonnage is available at a lower price. New structural work that has developed or been placed in this market the past week aggregates over 20,000 tons. The McMyler-Interstate Company, Bedford, Ohio, has taken from John Gill & Sons, Cleveland, the general contractors, the contract for 5000 tons for the new Washington, D. C., postoffice building. The contract for the steel has not been placed. The Michigan Central Railroad has sent out specifications for 10,000 tons for its new depot and train sheds in Detroit, for which it is expected that the contract will be closed early in the year. Bids are also being received for 5000 tons for the 20-story building to be erected in Detroit by the Dime Savings Bank. In Cleveland bids have been received for the Eagle school, 250 tons. Sheet prices appear fairly firm at the new level, although some of the low quotations made before the advance have not been withdrawn. We quote sheets at 1.90c., Pittsburgh, for No. 28 black, 2.90c. for No. 28 galvanized and 1.40c. for No. 10 blue annealed. Following the advance of soft steel bars, makers of hard steel bars have advanced their price to 1.15c. The demand for iron bars continues light, with no change in prices. We quote iron bars at 1.20c., Cleveland.

Old Material.—The market is quieter. Local steel mills, having bought a large tonnage of heavy steel scrap, are now well covered for their requirements until April 1. They are now practically out of the market, although they are willing to take odd lots at low prices. The absence of demand has resulted in the weakening of heavy steel prices. One local mill that had been buying steel scrap at $11.75 to $12 is now making its maximum quotation $11.50. Prices on other grades are fairly firm. There is some demand from dealers for borings and turnings, but other grades are inactive. Recent railroad offerings generally brought

good prices. Dealers' prices, per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling	$12.25 to $12.75
Old iron rails	14.00 to 14.50
Steel car axles	17.50 to 18.00
Heavy melting steel	11.25 to 11.50
Old car wheels	12.00 to 12.50
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	10.50 to 11.00
Railroad malleable	11.75 to 12.00
Light bundled sheet scrap	9.50 to 10.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$18.50 to $19.00
Cast borings	6.25 to 6.50
Iron and steel turnings and drillings	6.75 to 7.00
Steel axle turnings	7.25 to 7.75
No. 1 busheling	9.00 to 9.50
No. 1 railroad wrought	11.00 to 11.25
No. 1 cast	11.00 to 11.50
Stove plate	9.00 to 9.25
Bundled tin scrap	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, December 20, 1911.—(*By Telegraph.*)

Pig Iron.—The firmer attitude on prices assumed by Southern producers has brought on what might be termed a delayed buying movement, and practically all local pig iron merchants report a much better business than has been placed at this season for a long time. Quite a number of melters who have found it impossible to place orders at prices prevailing three weeks ago have deemed it expedient to contract at the present minimum quotation of $10, Birmingham, for No. 2 foundry, and, although several furnace interests are holding out for advances of 25c. to 50c. a ton on first half business, the majority are willing to take orders for this delivery at $10. At this price 500 tons was booked for a central Ohio melter and a nearby consumer took about the same quantity for first quarter shipment. Indiana and Illinois furnish several orders for assorted grades of Southern iron and Michigan buyers have also proved to be good customers during the last few days. Northern foundry iron is rather slow, but is held at $13, Ironton, but malleable, quotable at the same figure, is more active and a Michigan and a central Ohio melter recently booked 1500 tons each for first half movement. About 5000 tons of mixed Northern and Southern foundry grades will probably be bought soon by a central Ohio manufacturer, and there are a number of smaller inquiries before the trade. Late telegraphic advices to a local agency advance the price of ferromanganese from $38.50 to $41, f.o.b. Baltimore or New Orleans. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote, f.o.b. Cincinnati, as follows for prompt shipment:

Southern coke, No. 1 foundry and 1 soft	$13.75 to $14.00
Southern coke, No. 2 foundry and 2 soft	13.25 to 13.50
Southern coke, No. 3 foundry	12.75 to 13.25
Southern coke, No. 4 foundry	12.50 to 13.00
Southern gray forge	12.50 to 13.00
Ohio silvery, 8 per cent. silicon	16.95 to 17.20
Lake Superior coke, No. 1	14.70 to 14.95
Lake Superior coke, No. 2	14.20 to 14.45
Lake Superior coke, No. 3	13.70 to 13.95
Basic, Northern	14.20 to 14.45
Standard Southern car wheel	25.25 to 25.50
Lake Superior car wheel	19.00

(By Mail.)

Coke.—In addition to two or three smaller inquiries for furnace coke before the trade, there is one from a Southern consumer for a total of about 30,000 tons, deliveries to run throughout the next six months. Foundry coke is only in moderate demand. Prices in all three districts are firmer and Connellsville 48-hr. grades are quoted around $1.60 to $1.65 per net ton at oven for prompt shipment, with the better brands of Pocahontas and Wise County coke bringing about 5c. per ton higher. Foundry coke in all three fields ranges from $2 for prompt shipment to $2.25 on contract business. Some grades of furnace coke are held as high as $1.75 at furnace for first half delivery in all the three producing districts.

Finished Material.—Considering the season, business in almost all finished material lines is remarkably good. No large contracts are being placed, but the small buyers are coming in at a satisfactory rate. This is probably attributable to the stiffening of mill prices, which generally brings on a buying movement. Local agencies are quoting steel bars at 1.15c. to 1.20c. Structural material is quoted around 1.20c. to 1.25c., Pittsburgh, the last named figures representing what the mills are asking on future shipment business. The local warehouse price on steel bars is unchanged at 1.60c. and on structural material at 1.70c.

Old Material.—Dealers continue to talk more encouragingly, and while quotations are unchanged, they are being adhered to more strictly No improvement is expected in the buying movement until about the middle of January The minimum figures given below about represent what buyers are willing to pay for delivery at their yards in southern Ohio and Cincinnati, and the maximum quotations the selling prices f.o.b. at yards:

No. 1 railroad wrought, net ton	$9.75 to $10.50
Cast borings, net ton	4.50 to 5.00
Steel turnings, net ton	5.50 to 6.00
No. 1 cast scrap, net ton	9.50 to 10.25
Burnt scrap, net ton	6.50 to 7.00
Old iron axles, net ton	16.25 to 16.75
Bundled sheet scrap, gross ton	6.25 to 6.75
Old iron rails, gross ton	13.00 to 13.75
Relaying rails, 50 lb. and up, gross ton	20.75 to 21.50
Old car wheels, gross ton	10.50 to 11.00
Heavy melting steel scrap, gross ton	9.50 to 10.00

Boston

BOSTON, MASS., December 19, 1911.

Old Material.—The scrap market is showing a real improvement. Local transactions have not been important but the dealers believe the situation to be considerably stronger. Wrought iron pipe and No. 1 wrought and soft steel lines advanced 50c. per ton. The prices quoted below are those offered by the large dealers to the producers and to the smaller dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points, taking Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices.

Heavy melting steel	$9.50 to $10.00
Low phosphorus steel	11.45 to 11.95
Old steel axles	14.00 to 14.50
Old iron axles	17.00 to 18.00
Mixed shafting	12.75 to 13.25
No. 1 wrought and soft steel	11.00 to 11.25
Wrought iron pipe	9.25 to 9.50
Skeleton (bundled)	7.00 to 7.50
Cotton ties	7.00 to 7.50
No. 2 light	4.50 to 5.00
Wrought turnings	5.00 to 5.50
Cast borings	4.50 to 5.00
Machinery, cast	12.50 to 13.00
Malleable	9.25 to 9.75
Grate bars	6.00 to 6.50
Stove plate	8.00 to 8.50

Birmingham

BIRMINGHAM, ALA., December 18, 1911.

Pig Iron.—The better feeling continues. Sales have been fairly good the past week, but the aggregate has not been comparable with the few weeks previous. It was not, however, to be expected that the buying movement which developed in the latter part of November should continue at the heavy rate experienced for two or three weeks. An effort is now being made to mark up prices. Some brands are being held at $10.25, Birmingham, for No. 2 for first quarter, and $10.50 second quarter. Some iron is still available for shipment through the first half of 1912 on the $10 schedule. Shipments continue to move at a fair rate, and it is not thought that any increase in stock will be shown January 1, as compared with December 1, despite the fact that a good many foundries will be shut down the last week in this month for the holidays and to take inventory. Special brands of pig iron are bringing premiums as usual. For regular fracture grade iron, however, prices remain quotable, f. o. b. cars at furnaces, Birmingham, for shipment through to July 1, as follows, per gross ton:

No. 1 foundry and No. 1 soft	$10.50
No. 2 foundry and No. 2 soft	10.00
No. 3 foundry	9.50
No. 4 foundry	9.25
Gray forge	9.00
Standard basic	10.00
Off basic	9.50

Cast Iron Pipe.—Manufacturers of water pipe seem more interested now in summing up the results for the year than in actively seeking new business. Prices continue to be held very firmly. Production is at about the same rate, and the current make is being shipped day by day. This industry is in a very healthy condition, though the margin of profit is rather small. Prices continue to be quoted, per net ton, f. o. b. cars here as follows: 4 to 6-in., $23; 8 to 12-in., $22; 12-in. and over, average, $21. Gas pipe continues to take the usual differential of $1 per ton higher. Special fittings are quoted at prices ranging from $45 to $50 per net ton at foundry.

Old Material.—Shipments are moving at a better rate than for many months. The increased interest

has not yet had a tendency to improve prices, though the market is undoubtedly firmer. Quotations remain as follows, f. o. b. dealers' yards here, per gross ton:

Old iron axles (light)	$12.00 to $12.50
Old steel axles (light)	11.00 to 11.50
Old iron rails	11.00 to 11.50
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	8.00 to 8.50
No. 1 country wrought	6.00 to 6.50
No. 2 country wrought	5.50 to 6.00
No. 1 machinery cast	8.00 to 8.50
No. 1 steel	7.50 to 8.00
Tram car wheels	7.00 to 7.50
Standard car wheels	9.00 to 9.50
Light cast and stove plates	5.50 to 6.00

Coal and Coke.—Quite a demand is springing up for all grades of steam and domestic coal. This has had a tendency to slightly advance the spot price on steam coal, and extends to coke to some degree. Some furnace coke has changed hands at $2.25 at oven; but good grades of foundry coke continue to bring $3 to $3.50 per net ton at oven.

St. Louis

ST. LOUIS, MO., December 18, 1911.

A very generally optimistic tone prevails in the market and the pig iron aggregate of sales continues to encourage the furnace representatives. There is a very general belief that the first of the coming month will see a renewal of the activity which has been noted in recent weeks. Prices are stiffening materially and in some instances advances are to be noted.

Pig Iron.—The knowledge that a considerable number of furnaces are booked up for the first quarter complete and the inability to take orders for some brands being emphasized in some quarters have had the effect of stiffening prices for both Northern and Southern iron. The 50c. advance referred to last week in connection with Northern iron has become more general, while in the Southern field one furnace, which has been accused of selling pretty low, is holding its product at $10.25, Birmingham basis. Another and larger furnace makes the same quotation and is refusing business for the first quarter at any price and will not take it below $10.25 for the second. The tonnage of the week has been heavy, but the individual orders have not been so large as in recent weeks. The business of the week includes 1800 tons of No. 3 Southern and better, part being for high silicon, 1500 tons of No. 2 Southern and 2000 tons of malleable, the latter for a St. Louis casting company. Inquiries, for the most part for small amounts, include two for 500 tons each of coke car-wheel iron and charcoal car-wheel iron. There is a tendency to request anticipation of shipments, indicating an increase in consumption.

Old Material.—There is a much stronger feeling in the scrap market and the shorts are running to cover. The dealers are buying all they can get hold of and the mills are in the market for any bargains they can pick up. While the foundries are, perhaps, the heaviest purchasers, the rolling mills are not far behind. In all divisions of the market there is a generally upward tendency which is aided by a decided scarcity of the material. The only list out here is a small one of 150 tons from the Mobile & Ohio, which will close later in the week. We quote dealers' prices per gross ton, f.o.b. St. Louis, as follows:

Old iron rails	$13.50 to $14.00
Old steel rails, rerolling	11.50 to 12.00
Old steel rails, less than 3 ft	11.00 to 11.50
Relaying rails, standard section, subject to inspection	22.00 to 22.50
Old car wheels	12.50 to 13.00
Heavy melting steel scrap	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50

The following prices are per net ton:

Iron fish plates	$12.00 to $12.50
Iron car axles	18.00 to 18.50
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00 to 10.50
Railroad springs	9.75 to 10.25
Locomotive tires, smooth	13.50 to 14.00
No. 1 dealers' forge	7.50 to 8.00
Mixed borings	6.00 to 6.50
No. 1 busheling	9.00 to 9.50
No. 1 boilers cut to sheets and rings	8.00 to 8.50
No. 1 cast scrap	10.50 to 11.00
Stove plate and light cast scrap	8.00 to 8.50
Railroad malleable	8.50 to 9.00
Agricultural malleable	7.00 to 7.50
Pipes and flues	8.00 to 8.50
Railroad sheet and tank scrap	8.00 to 8.50
Railroad grate bars	7.50 to 8.00
Machine shop turnings	7.00 to 7.50

Coke.—No large contracts are being placed, consumers preferring to take as needed. By-product coke is commanding $5.10, delivered, in this market and there is considerable consumption of this grade by foundries.

Finished Iron and Steel.—Most of the buyers of structural shapes are covered for the first quarter and prices are stiffening, the quotation being 1.20c. to 1.25c., Pittsburgh, according to conditions. The plate market is slightly under a parity with the structural, but is stiff at the quoted figures of 1.15c. In bars there is a good tonnage moving and the prices have advanced. The market is stiff at 1.15c. In standard rails nothing is expected until after the first of the year. Track fastenings are in fair demand at firm prices. In light rails there is some tonnage moving to the lumber roads, but not in quantity to justify the statement that a buying movement has set in. The coal mines are purchasing liberally, but not up to what can be considered normal for this period of the year.

San Francisco

SAN FRANCISCO, CAL., December 12, 1911.

The dullness usually felt with the approach of inventory season is greatly intensified by the continued depression in prices and the possibility of obtaining prompt delivery on nearly all lines of steel products. Purchases by large buyers are almost entirely of the hand-to-mouth character, and stocks are being worked down to as small a condition as possible. Merchants, however, are beginning to figure on providing for the requirements of the coming year, and it is expected that a good many contracts will be closed within the next few days for delivery in the first quarter. On the other hand, mill representatives do not appear anxious to take such business on the basis of present prices. Numerous good-sized inquiries are coming from manufacturing interests along the coast.

Bars.—A large volume of business is more or less definitely in sight for next year, including much reinforcing material, though the present movement is rather slow. The general jobbing trade is very quiet. While a little firmer feeling is noted in prices, merchants are unwilling to increase their stocks before the end of the year. Any distinct upward movement of values would doubtless cause the closing of a number of contracts. Bars from store, San Francisco, are quoted at 2c. for steel and 1.90c. for iron.

Structural Material.—The only important contract recently left was the bridge at Portland, Ore., taken by the Pennsylvania Steel Company. The general building situation is fairly satisfactory, the November record being $1,617,890, compared with $1,255,892 for October, and $992,258 for November, 1910. In Oakland November values were more than double those of the same month of either 1909 or 1910, and the record at Portland, Ore., is the best so far this year. No great volume of work, however, is in immediate prospect. The steel contract for the Beck apartment house, about 250 tons, has been taken by Milliken Bros. Figures will be taken shortly on the State armory, which will require a heavy tonnage, and the Geary street car barn will probably be up about the first of the year. An inquiry is expected about the same time for the Garland Theater, Los Angeles, and a building for the Pacific Telegraph & Telephone Company at Portland, Ore. Plans will also be out shortly for the Sharon Estate building, this city. Other projects for which plans are under way are: A $900,000 hotel for the Grand Trunk Pacific Railroad at Prince Rupert, B. C.; a hall for the Elks at Seattle, Wash.; a large building for Cohn Bros., in Oakland; and a municipal office building at Los Angeles. Santa Barbara County, Cal., will open bids for a steel bridge February 5.

Rails.—The principal requirements for immediate construction have been provided for, and current business is of a small and scattered nature. Plans for extensive construction have been completed by many of the smaller coast concerns, and a considerable tonnage is in sight for the first or second quarter. More inquiry from logging interests is expected after the first of the year, especially in the north coast states. Light rails are moving in a limited way only.

Sheets.—Orders for black and galvanized sheets for immediate shipment are coming out rather slowly, though some increase in the consuming demand is expected. Merchants and large consumers are taking more interest in the market, and there is some disposition to place contracts for extended delivery,

though it is doubtful whether any heavy tonnage will be booked until the market exhibits more firmness.

Plates.—Aside from tank plates, the demand is limited, ship and car building operations on the coast being mostly of an unimportant character. Tank manufacturers report a fair amount of general work, and a heavier movement is expected next month. The jobbing movement is quiet, and merchants are keeping out of the market.

Merchant Pipe.—The total tonnage placed this year has been considerably below normal. Oil-country goods continue to find but a limited demand, and the distributive movement in small pipe is seasonably quiet. Merchants are buying in a very small way, but they feel that prices have reached bottom, and considerable business covering requirements of the first quarter is said to be pending.

Cast Iron Pipe.—Bids are being opened this week for quite a large quantity, including the 12,500 tons for Portland, Ore., and about the same amount in small lots for California interests. Among the latter are 600 tons for San Diego and 400 tons of light gas pipe for the Los Angeles Gas & Electric Company. Exeter, Cal., is taking bids on a complete water system, figuring on both cast iron and steel pipe, and bids will be taken on 360 tons for Las Cruces, N. M., December 15. The city of Seattle, Wash., has in contemplation a large pipe line, which, if of cast iron, will require about 24,000 tons. It has not been decided whether cast iron, riveted steel or wood stave pipe will be used.

Pig Iron.—The only recent purchase of any importance was made by the Pacific Coast Steel Company, which took a considerable tonnage of the stock held at Irondale, Wash. While nothing is being shipped from China at present, there is no shortage of Chinese iron here. Prices stand as before, No. 2 Southern foundry iron being quoted at $20, and Chinese iron at $23.

Old Material.—A number of new contracts for rerolling rails are expected to come out about the first of the year, but at present all lines of old material are dull, the only movement of steel melting scrap being small ballast shipments to Europe. Country wrought scrap is in a little better shape, with a steady though rather light demand. Prices are quoted as follows: Cast iron scrap, per net ton, $14; steel melting scrap, per gross ton, $11.50; wrought scrap, per net ton, $12.50 to $15; rerolling rails, per net ton, $11.

Buffalo

BUFFALO, N. Y., December 18, 1911.

Pig Iron.—Orders booked in this market for the week totaled 25,000 to 30,000 tons of foundry irons, about 10,000 tons of malleable and a fair tonnage of basic for first half delivery but largely for second quarter. Inquiry, while perhaps not so large in the aggregate as for any of the preceding three weeks, is of good volume and several large consumers whose inquiries are being quoted on have not as yet decided as to their purchases. Furnaces are holding firmly to their recently advanced schedules, being in a much stronger position now than for a long period and prompt shipment business is not of much interest to them on account of their capacity being sold for a considerable time ahead. Sales are not confined to the foundry and malleable trade, as consumers are also buying the specialties such as charcoal, high phosphorus and high silicon irons. Under active offering the price of charcoal iron has fallen off considerably and the tonnage of sales has increased materially. A local malleable and steel company specializing in railroad castings closed contract this week for about 5000 tons of malleable castings for brakebeam equipment, etc. Stocks on furnace yards continue to diminish from day to day. For first half delivery we quote as follows, f.o.b. Buffalo:

No. 1 X foundry	$13.75 to $14.00
No. 2 X foundry	13.50 to 13.75
No. 2 plain	13.25 to 13.50
No. 3 foundry	13.25
Gray forge	13.00
Malleable	13.75 to 14.25
Basic	14.00 to 14.25
Charcoal	15.50 to 16.50

Finished Iron and Steel.—There is continued improvement in the market, the volume of business being large and satisfactory. Consumers are now more anxious to place contracts for future delivery than mills are to enter them and a fair amount of contracting is being done for the first quarter. Many mills and agencies are declining to make contracts for second quarter. Such manufacturers as are closing contracts for second quarter are taking business only at an advance of $1 to $2 per ton over first quarter. Specifications on bar contracts are good for the season of the year and 1.15c., Pittsburgh base, is now the absolute minimum so far as can be ascertained. Some of the leading producers have declined desirable tonnage offered them at 1.10c. Prices on plain structural material and plates show a minimum of 1.20c. with 1.25c. asked on the less desirable specifications. The above prices on both bar and structural material are limited to immediate orders and first quarter tonnages. There has been an advance on sheets of what would amount to practically $2 per ton; the minimum asking price now being 1.90c., base, for No. 28 one pass cold-rolled and annealed. An order is reported as placed this week for 300 tons of black sheets per week for the first six months of 1912 for a local user. Nail and wire prices are also firmer and tonnage has been refused by producers at the price formerly ruling, $1.55, Pittsburgh, now being the minimum quoted on nails. There is very strong evidence that the heavy buying of these products will lead to a further advance in the near future. Very active conditions prevail in fabricated structural lines. The price situation is a little stronger and the prospects for early 1912 business are good. Bids for the steel for the Niagara Chocolate factory, Niagara Falls, N. Y., will be called for this week with a tonnage of about 300 tons. Bids went in this week for steel for the First Church of Christ, Scientist, Buffalo, 250 tons, and bids were received last week by Architects Esenwein & Johnson, Buffalo, for the 1000 tons of steel for the 12-story and basement Bancroft Hotel, Worcester, Mass. It is understood that financial arrangements have been completed for the construction of the Terminal Building, Syracuse, and that contract for construction will soon be awarded, 1300 tons of steel being involved. The Syracuse Bridge Company has received contract for a small quantity of steel for remodeling the Consumers brewery.

Old Material.—Market conditions are stronger than a week ago, although consumers are not showing so much activity in placing orders as at that time, evidently fearing the tendency to raise prices which might result from their coming too actively into the market. Dealers are now paying as much or more for scrap on railroad lists as consumers were offering and in consequence are taking the bulk of railroad offerings for the month. Prices are unchanged but are very firm. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$13.00 to $13.25
Low phosphorus steel	15.75 to 16.25
No. 1 railroad wrought	14.00 to 14.50
No. 1 railroad and machinery cast scrap	13.50 to 14.25
Old steel axles	18.50 to 19.00
Old iron axles	22.00 to 22.50
Old car wheels	12.75 to 13.00
Railroad malleable	12.75 to 13.00
Boiler plate, sheared	13.75 to 14.25
Locomotive grate bars	11.00 to 11.25
Pipe and tank	9.75 to 10.25
Wrought iron and soft steel turnings	7.25 to 7.50
Clean cast borings	6.75 to 7.00

The German Iron Market

The Situation Growing Stronger

BERLIN, December 8, 1911.

The iron market has commenced the final month of the year with a fresh accession of strength. The reports from the trade are growing better from week to week, and they begin now to read like "boom" literature. The trading on the Düsseldorf Exchange a week ago brought out higher prices for several products. Soft steel bars were raised from 104 to 106 marks and iron bars from 130 to 132 marks. The Band Iron Association has advanced prices again by 2.50 marks.

The strongest evidence of the activity of the trade is furnished by the statistics. Pig iron production for November reached 1,313,896 metric tons. This is about 21,000 tons less than for October, but the month was a day shorter. The daily rate of production was 734 tons greater than in October. For 11 months the production amounted to 14,046,586 tons, a gain of 670,345 tons over last year. The shipments of the Steel Works Union are given out provisionally at 489,000 tons, or about 17,000 tons more than in October. The best production statistics for some months are those given out by the Union for shipments of class B products (bars, plates, rods, tubes, castings and forgings) for

October, which showed a crude steel equivalent of 598,212 tons, against 553,643 tons in the previous month and 487,490 tons in October, 1910. Each branch registered record figures. When the allotments were last made by the Union, upon its renewal in 1907, the amounts assigned were regarded as highly extravagant; but the October figures show that the allotments in bars were actually exceeded by above 20 per cent., in plates by nearly 19 per cent., in wire rods by above 16 per cent., and in tubes by more than 9 per cent. In view of these figures another attempt will be made at this month's meeting of the Union to advance allotments. Motions have already been sent in for a 20 per cent. increase in bars and rods, and it is reported that a similar increase will be asked for in all the other products. In view of the activity of the trade it is said in some circles that the increases are likely to be voted. This seems doubtful, however, as it is known that some of the most powerful of the big mixed concerns are opposed to making any changes pending the renewal of the Union, since they believe that this would only complicate the negotiations still further.

The ore market is in good shape, both for home and foreign ones. Buying for next year in the Siegerland region has been very heavy, and some establishments have even placed contracts for two or three years ahead. Calls for ores on contract have grown more urgent. Foreign ores are quite firm. Imports in November were heavier than for a month or two.

Heavy Pig-Iron Contracts for Next Year

The contracts for pig iron on next year's account are so far beyond what was looked for that explanations are forthcoming. It is asserted that considerable speculative buying has taken place in anticipation of higher prices for the second half of 1912. This expectation is based on rumors that coke prices are to be advanced next spring. The calls for delivery of pig iron are also unusually heavy because it is assumed that the new syndicate will charge on unfilled contracts on January 1 the new prices adopted by it. The market for scrap is firm. More old material has been coming on the market, but the demands of the open-hearth works have increased in still greater proportion. Export sales of shop scrap are very heavy.

Steel material for further manufacture is being specified for on contracts so rapidly that the mills are often unable to fill orders with the desired promptness. Not a few of the big mixed concerns, too, are now consuming so much of their steel in turning out the more finished products that they are not able to come up to their allotments in the Union; nevertheless, the latter is still able to ship in excess of allotments, thanks in part to an active export demand, which shows no signs of abating. Business in beams and other structural shapes is rather quiet, but very satisfactory relatively to other years. The home demand for steel rails shows the same slackness that has prevailed for many months, but export trade remains active. South American countries continue to send in big orders, and further good contracts from there are in sight.

Bars Never More Active

The bar market has perhaps never shown such activity as now. Some works are sold four or five months ahead; other reports say that all mills are sold out to the second quarter of 1912. Specifications on contracts are being sent in urgently, particularly from the export trade, but the mills in many cases require six to eight weeks for delivery. Prices for export have further risen. In view of the extreme activity in this specialty it is suspected that considerable speculative ordering has been undertaken in anticipation of higher prices next year.

In band iron most of the mills have sold to the end of March, and they appear not to be taking orders beyond that date. The export demand is very good, and prices have recently been raised several times. The prospects for employment on ship plates have further improved, as a number of orders for new steamers have just been reported. The wire rod association has been able to assign orders to its members that will keep them busy for several months. The foreign market is a good, steady buyer. Wire mills have considerable work to do, but their prices remain unsatisfactory, and this is also true of wire nails. In the latter, however, heavy selling for the March quarter has occurred, and prices have been lifted 2 or 3 marks from the lowest level prevailing after the old trade combination was dissolved. In tubes the demand is increasing and prices are somewhat firmer. In gas pipe the greater part of the capacity of the mills for the first quarter has been sold. Cast-iron pipe is more active, with slightly better prices. The hardware trade is well employed in all its branches.

The Fried. Krupp Company has announced a dividend of 10 per cent. This is the same as last year, but it could easily have been increased to 14 per cent. Net earnings rose to 28,712,000 marks, as against 21,265,000 last year. This year the amount carried to the reserve has been increased by above 7,000,000 marks. In thus adding to its reserve the company is imitating the example of several other big concerns. They are all evidently equipping themselves financially for whatever eventualities may come if the Steel Works Union is not renewed.

The Aumetz-Friede Company, which is situated near the French frontier, and has recently grown into a prominent position among southwestern works, is negotiating for the absorption of the well-known Mannstaedt Façoneisenwerk, situated at Kalk near Cologne, and also the Düsseldorfer Eisen und Drahtindustrie. Meetings of the three concerns are called for the end of next week to perfect the arrangements.

New York

NEW YORK, December 20, 1911.

Pig Iron.—After a month of good buying the market has quieted. One interest which buys its pig iron in New York for plants at Uniontown, Pa., and Norwich, Conn., manufacturing heating apparatus and some special products, has been in the market for 7000 tons, chiefly No. 2 iron, and is believed to have closed for the greater part of it. Deliveries extend into the second quarter of 1912. A sale of 1000 tons to a New Jersey foundry is reported for delivery in the first quarter. Sales by Buffalo furnaces have fallen off so far as the New England trade is concerned. Apart from some inquiry from a large pump manufacturer, which has been asking for prices at intervals for some weeks, no important business is known to be under negotiation in this market. The situation seems to be that most of the large consumers have bought such iron as they expect to melt in the first quarter and some of them have covered for the greater part of the second quarter. The smaller foundries prefer to buy on a rising market, since the advance in the price of castings under such conditions is usually more than compensation for any increase in pig iron. Such buyers have not been on the hunt for bargains and will come into the market from time to time in reasonable anticipation of their wants. While Buffalo furnaces are asking from 25 cents to 50 cents more no advance has been actually established except perhaps on small lot business. The situation in Eastern Pennsylvania does not gain strength, one merchant furnace and a steel company with a surplus of pig iron being rather active competitors for what business is going. One of the pipe companies is expected to buy 3,000 tons in addition to considerable purchases in the early part of the month. Quotations are as follows for northern iron at tidewater: No. 1 foundry, $15 to $15.25; No. 2 X, $14.75; No. 2 plain, $14.50 to $14.75. For southern iron we quote $15 to $15.25 for No. 1 foundry and $14.50 to $14.75 for No. 2 foundry.

Finished Iron and Steel.—A good run of business continues and prices are if anything stiffer. One of the features is a greater hesitancy on the part of sellers to close on buyers' demands for anything for future delivery, even for the first quarter. For example, a fair tonnage of plates is now pending because the mill representative has not yet agreed to take it for the second two months of the quarter at 1.15c., Pittsburgh basis. A greater number of mills than was the case last week are standing out for the higher prices of 1.15c. for bars and 1.20c. for plates and shapes, and the asking price for large lots for one large company is even 1.25c., Pittsburgh. Only the most attractive specifications and for immediate shipment, in plain structural material, will command 1.15c., Pittsburgh, although, for the exception which proves the rule, a case is known of large tonnage which will probably be closed for at least 1.10c. for delivery early in 1912. Low prices are also disappearing in bar iron and 1.20c. at mill is now more generally asked, with shading where there is much competition. It should be stated that some buyers hold the view that the recent high rate at which business in the steel business has been conducted is not of long duration, but it is a widespread belief that prices will remain firm, without strong evidence of an advance. The large rail inquiries which are expected early in the year will, of course, have an uplifting effect. New activity of large size in the structural field is practically absent and some of this amounts to bidding on redesigned build-

ings on which bids have already been received, like the Allyn House Extension, Hartford, Conn., 1500 tons, and the Portsmouth, N. H., navy yard bridge, 400 tons. There are still pending, of the projects regarded as particularly alive, the 2000 tons for the Graphic Arts Building, West Twenty-fifth street, New York; New York Central Terminal Area, 1000 tons; bascule bridge, New York, New Haven & Hartford Railroad at Buzzard's Bay, 500 tons, bids on which go in December 28; the Auerbach candy factory, 2000 tons; the Hess loft building, Twenty-sixth street and Fourth Ave., 3000 tons. The Delaware, Lackawanna & Western Railroad will take bids on 8000 tons of bridge work for 1912 on December 23, and the Grand Trunk is in the market for 7000 tons of bridge material. Among recent awards may be mentioned the Eagle Silk mill, 3000 tons, to Hay Foundry & Iron Works, for which the Eastern Steel Company will supply the structural shapes; New York Central Terminal Area, 3500 tons, to McClintic-Marshall Construction Company; the Royster Hotel, Norfolk, Va., 1200 tons, to the American Bridge Company; addition to the Hudson Terminal Building, 900 tons, to the American Bridge Company; Bloomingdale Construction Company's apartment house, West 104th street, 400 tons, to Milliken Brothers; the Fifty-fourth Street & Park Avenue Company's building, 650 tons, to Harris H. Uris Iron Works. Quotations are: Steel bars, plates and plain structural material, 1.31c. to 1.36c.; bar iron, 1.27½c to 1.32½c., all New York. Plain material and plates from store, New York, 1.60c to 1.70c.

Cast Iron Pipe.—The city of New Bedford, Mass., will open bids December 21 on 700 tons of 6, 8 and 12-in. The Sewage Disposal Commission, Pittsburgh, Pa., will open bids January 1 for 750 tons of 30-in., class A. Although hardly as heavy as two or three weeks ago, a good volume of inquiry is being received from private buyers. An encouraging feature is that these buyers almost invariably desire larger quantities than when they were in the market a year ago. Car load lots of 6-in. are quoted at $22 to $23 per net ton, tidewater.

Old Material.—A better movement is reported in heavy melting steel scrap. Consumers of steel scrap are conservative in their views and offer but a trifle more than they were willing to pay two or three weeks ago, but dealers apparently need good quantities to fill contracts, as they are bidding higher than the prices named by the mills. Practically no steel scrap is available except at full prices, all holders being quick to appreciate the improving conditions and desiring to get for themselves as much of the advance as possible. Rolling mill material is in somewhat better demand and prices are slightly higher. Cast scrap is fairly active. Dealers' prices, per gross ton, New York and vicinity, are as follows:

Old girder and T rails for melting	$10.25 to $10.50
Heavy melting steel scrap	10.25 to 10.50
Relaying rails	20.50 to 21.00
Rerolling rails (nominal)	12.00 to 12.50
Standard hammered iron car axles	20.00 to 20.50
Old steel car axles	15.50 to 16.00
No. 1 railroad wrought	13.50 to 14.00
Wrought iron track scrap	12.00 to 12.50
No. 1 yard wrought, long	11.00 to 11.50
No. 1 yard wrought, short	10.25 to 10.50
Light iron	4.75 to 5.00
Cast borings, clean	6.50 to 6.75
Mixed borings and turnings	5.50 to 5.75
Wrought turnings	6.75 to 7.00
Wrought pipe	9.75 to 10.00
Old car wheels	12.00 to 12.50
No. 1 heavy cast, broken up	11.00 to 11.50
Stove plate	8.75 to 9.00
Locomotive grate bars	9.00 to 9.50
Malleable cast	10.00 to 10.50

Ferroalloys.—Dealers now quote 80 per cent. ferromanganese at $41 per ton, Baltimore, the price having advanced from $38.50 where it stood for several weeks. The advance is declared to be due to the excellent demand which has developed of late and also to conditions abroad, where a combination of manufacturers exists. In buying of recent date about 8000 tons of manganese is said to have been contracted for. Ferrosilicon is quoted at $70, Pittsburgh, in carload lots. Inquiries have been good. A transaction was closed last week in which 600 tons of ferrosilicon was sold at $68 per ton.

The Debevoise-Anderson Company, 95 Liberty street, New York, has been appointed sole agent for the sale of Jamison selected 72-hour foundry coke in the State of New Jersey.

Metal Market

NEW YORK, December 20, 1911.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead		Spelter	
Dec.	Lake.	Electrolytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
14	13.87½	13.75	43.75	4.45	4.35	6.40	6.25
15	13.87½	13.75	44.05	4.45	4.35	6.40	6.25
16	13.87½	13.75	.....	4.45	4.35	6.35	6.20
18	14.00	13.87½	45.00	4.45	4.35	6.30	6.15
19	14.00	13.87½	45.00	4.45	4.35	6.30	6.15
20	14.00	13.87½	45.00	4.45	4.35	6.30	6.15

Moderate demands exist for all metals. With no large business in either copper or tin, the prices of these metals are higher and well maintained. Spot copper has been sold at 14c. and over, while the foreign syndicate controlling tin has indirectly fixed the price here at 45c.

New York

Copper.—The market in copper, though very dull during the week, has attained higher prices, a tendency which still continues. Prices here have been dragged up by the conditions abroad. The sales for home consumption have not been nearly equal in volume to those for export. In addition to this, all reports agree that speculators have done much to create an active market on the other side. Consumers appear to be well supplied for January but not for February. They have not believed in the advance in prices and are hoping for a reaction. On the other hand, the opinion is strong that present prices will hold good for some time to come and may advance. The next report of the Copper Producers' Association, to be issued in January, is generally expected to show another substantial decrease in stocks. While Lake is generally quoted to-day at 14c. and electrolytic at 13.87½c., dealers have made some sales of prime Lake copper at 14.12½c. to 14.50c. and electrolytic at 14c. to 14.12½c. Spot copper is quoted in London to-day at £62 10s., and futures at £63 7s. 6d. Exports have been heavy this month, reaching a total of 22,776 tons.

Pig Tin.—Business the past week has been quiet in pig tin, although foreign influences have caused an advance in price. The last three days it has stood at 45c. There is usually little buying at this season, and what has been done has been almost entirely for future delivery. On Monday last the English syndicate, which has firm control of the tin supply, raised the price in London £5 10s. per ton, equal to about 1c. a lb. here. The price jumped to 45c. on that day and has been maintained since, although a little weakness developed this morning. There is a feeling in some quarters that more tin has been sold than actually exists in stock, and that the attempt to cover when settlements are made is a cause of the fluctuations in price. In London spot tin is quoted to-day at £205 10s., with futures at £193 10s. Arrivals of tin during the month have been 3005 tons and the amount afloat is 1645 tons.

Tin Plates.—There has been little change in the tin plate situation, except that an increased number of mills have been put in operation and specifications on contracts for future delivery are coming a little more freely. Prices remain about the same, $3.64 being quoted in New York for 100-lb. coke plates. Tin plates laid down in Swansea, Wales, are quoted at 13s. 7½d., an advance of 1½d. Prospects for good business after the holidays are excellent.

Lead.—Prices are firm. The market is dull and without feature. In New York 4.45c. is quoted and in St. Louis 4.35c.

Spelter.—There is very little activity in the spelter market. During the week there was evidence of weakness in the West, due to the very light demand for the metal. There is a feeling that during the recent season of high prices buyers became scared and kept out of the market and have not yet recovered. Prices quoted are: New York, 6.30c. and St. Louis, 6.15c. Some dealers quote slightly higher figures.

Old Metals.—The market continues strong. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	13.25 to 13.75
Copper, heavy and wire	13.00 to 13.25
Copper, light and bottoms	11.75 to 12.00
Brass, heavy	9.25 to 9.50
Brass, light	7.25 to 7.50
Heavy machine composition	11.25 to 11.50
Clean brass turnings	8.75 to 9.00
Composition turnings	9.25 to 9.50
Lead, heavy	4.20
Lead, tea	3.95
Zinc, scrap	5.25

Antimony.—The only change in the antimony market, which continues dull and inactive, is an advance in the price of Hallett's, which is now quoted at 7.75c. to 7.80c. and in Cooksons, which is now 7.87½c. to 8c. The prices of Hungarian and Chinese grades are so far unaffected.

Chicago

DECEMBER 18.—The market has been decidedly active, with a generally strong undercurrent and a trend distinctly in the direction of higher prices for copper. Tin fluctuated to both higher and lower prices during the course of the week with a net advance over last week's quotation of 1c. We quote at Chicago as follows: Casting copper 14c.; Lake, 14.25c., in carloads, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 46c.; small lots, 48c.; lead, desilverized, 4.40c. to 4.45c., for 50-ton lots; corroding, 4.55c. to 4.60c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.30c. to 6.40c.; Cookson's antimony, 8.75c., and other grades, 7.75c. to 8.25c., in small lots; sheet zinc is $8.25, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount, in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 11c.; copper bottoms, 9.75c.; copper clips, 10.75c.; red brass, 10c.; yellow brass, 7.75c.; lead pipe, 4c.; zinc, 4.50c.; pewter, No. 1, 26c.; tinfoil, 33c.; block tin pipe, 38c.

St. Louis

DECEMBER 18.—The metal market in spots shows weakness and in others strength, the spelter quotations having taken the hardest fall during the week. The price to-day is easy for lead, ranging from 4.25c. to 4.30c. The spelter quotation is steadier than during the closing days of last week, an upturn from the low point having taken place to 6.25c. Tin is decidedly off at 44.45c. Copper is considerably higher, lake being quoted at 14.35c. and electrolytic at 14.22½c. Antimony is unchanged at 8.10c. The sudden slump in spelter from 6.85c. to 6.10c., which was the bottom of the drop, caused a slump in the Joplin ore market in the offerings for zinc blende, and the best price $45 with a range down to $40 per ton. The choicest lots brought $48 per ton. On the contract basis the 60 per cent. grade brought $49.55, with the choicest lots commanding $52. The terms of the contract system of buying have been so changed that the ore producer is not receiving the same liberal price paid heretofore and as a result several companies have decided to discontinue selling on that basis. Calamine brought $22 to $25 per ton, choice lots commanding as high as $30. Lead ore was 50c. weaker per ton, the price being $63.50. On miscellaneous scrap metals we quote as follows: Light brass, 4.50c.; heavy brass and light copper, 8.50c.; heavy copper and copper wire, 9.50c.; zinc, 3.50c.; pewter, 20c.; tin foil, 29c.; tea lead, 3c.

Iron and Industrial Stocks

NEW YORK, December 20, 1911.

With the exception of a few stocks in which special influences were operative to affect values adversely, all kinds of securities have shown marked strength in the period under review. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week has been as follows:

Allis-Chalm., com...	1⅛- 2⅝	Pressed Steel, com..	32⅞- 34
Allis-Chalm., pref...	6⅝- 8½	Railway Spring, com.	31¼- 32
Baldwin Loco., pref.	107	Railway Spring, pref.	101
Beth. Steel, com....	29¼- 30⅜	Republic, com.....	24 - 27½
Beth. Steel, pref....	56 - 60⅛	Republic, pref.....	84 - 85¾
Can, com.....	10¾- 11¼	Sloss, com.....	40 - 42½
Can, pref.....	89¾- 91½	Pipe, com.....	14¾- 16
Car & Fdry., com...	53⅜- 55⅜	Pipe, pref.....	49¾- 51
Car & Fdry., pref.	117⅛	U. S. Steel, com....	64⅛- 69¼
Steel Foundries.....	33 - 33½	U. S. Steel, pref...	109½-111⅜
Colorado Fuel.....	27½- 29	Westinghouse Elec..	65 - 69
General Electric....	153¾-155½	Va. I. C. & C.....	68 - 73½
Gr. N. Ore Cert....	33¾- 36½	Am. Ship, com.....	54
Int. Harv., com....	107 -110¾	Chic. Pneu. Tool...	46½- 46⅝
Int. Harv., pref....	120¼-120½	Cambria Steel.....	43⅞- 44¾
Int. Pump, com....	33¼- 33⅞	Lake Sup. Corp....	26½- 28
Int. Pump, pref.....	83½	Pa. Steel, pref.....	102¼
Lackawanna Steel.....	30	Warwick	10½- 12
Locomotive, com....	36¾- 37⅛	Crucible Steel, com.	11½- 12⅛
Locomotive, pref....	103 -104	Crucible Steel, pref.	79¾- 82⅛
Pittsburgh Steel, pref.	102½	Harb. Wk. Ref., pref.	99

Dividends Declared

The Western Electric Company, regular quarterly, $2 per share, and an extra dividend of $2 per share, payable December 30.

The Standard Coupler Company, regular semi-annual, 4 per cent. on the preferred stock and 2 per cent. on the common, payable December 23.

The Otis Elevator Company, regular quarterly, 1¾ per cent. on the preferred stock and 1 per cent. on the common, payable January 15.

Directors of the Empire Steel & Iron Company at their regular semi-annual meeting December 12, took no action on the dividend on the preferred stock.

The American Locomotive Company, regular quarterly, 1¾ per cent. on the preferred stock, payable January 22.

The Yale & Towne Mfg. Company, regular quarterly, 1½ per cent., and a special dividend of 1 per cent., payable January 2.

The American Iron & Steel Mfg. Company, regular quarterly, 1¼ per cent. on the preferred and common stock, payable January 1.

The Baldwin Locomotive Works, regular semi-annual, 3½ per cent. on the preferred and 1 per cent. on the common stock, payable January 1.

The Nova Scotia Steel & Coal Company, regular quarterly, 1½ per cent. on the common stock, payable January 15.

The Sharon Steel Hoop Company, regular quarterly, 1¾ per cent., payable December 22.

The American Seeding Machine Company, regular quarterly, 1½ per cent. on the preferred stock and 1 per cent. on the common stock, payable January 15.

The Westinghouse Air Brake Company, 2½ per cent. regular quarterly, 1½ per cent. extra and 1 per cent. special, payable January 10.

The Union Switch & Signal Company, regular quarterly, 3 per cent. on the common and same on the preferred stock, payable January 10.

The Dominion Steel Corporation, regular quarterly, 1 per cent., payable January 2.

The E. W. Bliss Company, regular quarterly, 2 per cent. on the preferred stock, payable January 2.

The Hydraulic Press Mfg. Company, Mount Gilead, Ohio, pioneer manufacturer of hydraulic cider and grape juice machinery, has in recent years made great strides into various lines of heavy hydraulic machinery. This company has just completed arrangements for establishing a new brass foundry in the plant for the purpose of making at home the many brass castings on the hydraulic machinery. The new foundry will have capacity to meet not only the home needs but many outside calls as well.

The Alabama Consolidated Coal & Iron Company, Birmingham, Ala., announces that, beginning with January 1, Mathew Addy & Co., Cincinnati, Ohio, will have the exclusive sale of its pig iron in the territory north of the northern boundary of the following States: North Carolina, Tennessee, Arkansas, Oklahoma, New Mexico, Arizona and California. The company's principal brands are Clifton, Ironaton and Etowah.

The December meeting of the New York Section of the American Institute of Mining Engineers was held in the Engineering Societies Building, 29 West Thirty-ninth street, New York, on Wednesday, December 20, at 8.15 p. m. Dr. R. W. Raymond, secretary emeritus, gave an account of the Institute party in Japan, on the recent trip following the California meeting. On January 5, 1912, Gardner F. Williams, Washington, D. C., will deliver an illustrated lecture on "The South African Diamond Fields."

The Carnegie Steel Company has awarded a contract to the Master & Muller Construction Company, Cleveland, Ohio, for the remodeling and enlargement of its Cleveland warehouse. A one-story extension will be built, 166 x 206 ft.

The Engineers' Club of St. Louis, Mo., has elected A. S. Langsdorf, Washington University, president; John Hunter, Union Electric Light & Power Company, first vice-president; H. H. Humphrey, second vice-president; W. W. Horner, secretary, and W. E. Rolfe, treasurer.

The Buffalo Union Furnace Company, Buffalo, N. Y., contemplates building a blast furnace next spring at Port Colborne, Ontario, at the entrance to the Welland Canal, to supply its Canadian trade.

Personal

E. L. Messler, for the past twelve years general superintendent of the Jones & Laughlin Steel Company's Pittsburgh coke ovens and blast furnaces, has tendered his resignation to accept the position January 1 of assistant to the president of the Riter-Conley Mfg. Company, Pittsburgh. During his connection with the Jones & Laughlin Steel Company, a record on blast-furnace dismantling and rebuilding was made. The No. 3 furnace of the Eliza group was torn down, a 400-ton salamander taken out, foundations put in and a new 22 x 96 ft. furnace erected with top rigging, downcomer, dust catcher, gas mains and cast house in 73 days. A year previous No. 1 furnace of the same group was rebuilt, which involved the same work, in 95 days. Previous to that connection he was assistant superintendent of the Duquesne furnaces of the Carnegie Steel Company, and was one of the heads of the construction force in the building of these furnaces, the first of the very large, economically producing blast furnaces in the country.

The statement is made that President J. C. Maben of the Sloss-Sheffield Steel & Iron Company will remove from Birmingham, Ala., to New York City. J. C. Maben, Jr., has been elected vice-president of the company in charge of operations. J. W. McQueen continues as vice-president in charge of sales and financial operations.

James G. Heggie, boiler manufacturer, Joliet, Ill., sailed Saturday, December 16, to spend the winter in Scotland.

William H. Wilson of the Chicago sales office of the Jeffrey Mfg. Company, Columbus, Ohio, in charge of the conveying department, will sever his connection with that company at the end of the year to engage in business in Chicago as a general advertising agent for technical advertising.

Albert Ladd Colby, consulting engineer, 165 Broadway, New York, has returned from a three months' study of the latest developments in German by-product coke manufacture.

James L. Gough, for the past seven years assistant manager of the Marshall & Huschart Machinery Company, Chicago, severed his connection with that company December 16.

Obituary

WILLIAM J. CARLIN, Pittsburgh, died December 14, after a long illness, aged 54 years. He was born in Allegheny City, and was a son of Thomas Carlin, who in 1860 established the firm bearing his name to deal in machinery, and eventually took his sons, William J. and John H., into partnership. On the death of the elder Carlin in 1884, the business was continued under his name by the sons until 1899, when it was incorporated as the Thomas Carlin's Sons Company, with William J. Carlin as president, and he continued to hold that office until his death. He leaves a widow and one son, David N. Carlin.

Customs Decisions

Old Sugar Mill Shafts

The Board of United States General Appraisers has made a ruling in favor of a contention raised by A. D. Strauss & Co. regarding the classification of broken bull shafts collected from broken-down machinery in sugar mills. The appraiser at New York reported that, from an examination of the merchandise, he found it to be second-hand shaftings varying in size and fitted to be rerolled or hammered, and better than scrap iron fit only for remanufacture by remelting. The collector assessed duty at the rate of 45 per cent. under the tariff act of 1909, as "manufactures of metal not specially provided for." The importers claimed that the importations are junk within the meaning of the law, and as such entitled to free entry. Several other claims are made, but they are not deemed applicable by the board. Judge Fischer sustains the contention as junk and reverses the collector.

Book Sewing Machines

The American Type Founders Company succeeded in securing a reduction in the duty assessed on so-called thread book sewing machines. The testimony showed that the machine sews the signatures together preparatory to binding. The customs officials held that the machines are not the kind of sewing machines contemplated by Congress in framing paragraph 197 of the present act, which specifies "sewing machines." The government contention was that the sewing machines enumerated in the paragraph refer to the article for domestic use and not to machines for general purposes. Duty was accordingly assessed at 45 per cent. as manufactures of metal. This classification is reversed and the articles allowed to enter as "sewing machines" at 30 per cent. ad valorem.

Steel Strips in Coils

The board has sustained the action of the customs officials in assessing a high duty on steel strips in coils used in the manufacture of corset steel, clasps, etc. The case stands in the name of Strouse, Adler & Co., and is in the nature of a test of the act of 1909. The merchandise was assessed at the rate of 35 per cent. under the provision for "steel in strips and coils." The importers alleged the goods subject to tax at applicable specific rates as "steel not specially provided for." Judge Fischer says in his decision overruling the importers' claim that there is nothing in the official record to disturb the assessment as made by the customs officials.

Manganese Metal

The Goldschmidt Thermit Company failed to obtain relief from an assessment made on importations of manganese metal. The collector exacted duty at 20 per cent. ad valorem under the provision in the present tariff act for "metals unwrought, not specially provided for." The protestant relied on the claim that the importations are dutiable at $2.50 a ton under paragraph 118 as "ferromanganese." The testimony, it is held, does not substantiate the claim. The collector is affirmed.

Forged and Turned Steel Shafts

The collector at New York has been reversed in cases dealing with the classification of steel shafts which have been forged and subsequently turned in a lathe. Duty was exacted at the rate of 45 per cent. as "manufactures of metal." This classification is held erroneous by the board and duty granted as "forgings" at 35 per cent. on the value. The importers include the American Locomotive Automobile Company and the Hewitt Motor Company. Crank shafts imported by Peter A. Frasse & Co. and claimed to be forgings were denied entry as such, the collector's assessment at 45 per cent. under the metal schedule of the tariff being upheld.

Japanned Sheets

Adverse action has been taken on a protest filed by the American Button Works in a protest dealing with the classification of japanned sheets, which were returned as "manufactures of metal" with a duty of 45 per cent. It was alleged that the merchandise is dutiable at 1 2/10 cents a pound under paragraph 130, which refers to sheets or plates of iron or steel. The decision says that the sheets are not tinned and are coated with lacquer. In the opinion of the board they do not fall within the paragraph claimed. The assessment is affirmed.

Iron Sand

Acting under instructions from the Department of Justice, Charles D. Lawrence is preparing a test case under the tariff act of 1909 to have determined judicially the proper classification of so-called iron sand used in the cutting and polishing of granite. Under previous tariffs, merchandise of this character has been classified under "manufactures of metal" and paid duty at the rate of 45 per cent. The present law, however, contains a specific provision for iron sand and allied products. With a view to clearing up uncertainty regarding the classification, the government has ordered importations assessed at the rate of 1 cent per lb. under the provision in the present act for "grit, shot and sand made of iron or steel that can be used only as abrasives." The Harrison Supply Company, which figures in the test litigation, maintains that the iron sand can be used otherwise than as an abrasive. It is claimed to be entitled to enter at 10 per cent. as a crude artificial abrasive, or in the alternative as a manufacture of metal at 45 per cent. Most of the sand is manufactured in England and Scotland.

Pittsburgh and Vicinity Industrial Notes

W. J. Greer, Pittsburgh representative of the Van Dorn Electric Company, Cleveland, Ohio, has secured a repeat order from the McClintic-Marshall Construction Company for a number of portable drilling and reaming machines to be used in the fabrication of the structural steel work on the Panama Canal, and has also received an order for various sizes of machines to be used in the wood and steel car departments of the Cambria Steel Company.

The Pennsylvania Casting & Machine Company, North Side, Pittsburgh, is making some additions to its power plant, and is installing a Jones underfeed stoker to operate a 150 h.p. boiler.

The Anterior Coal & Coke Company, Pittsburgh, has been chartered, with a capital stock of $1,000,000, to mine coal and manufacture coke. The incorporators are Henry W. Jacob, W. H. Wessels, Pittsburgh, Pa.; W. C. Wessels, Greenock, Pa.

Samuel W. Hay's Sons, Keenan Building, Pittsburgh, are installing two 15 x 18-in. Corliss and one single valve engine, manufactured by the Ridgway Dynamo & Engine Company, in the municipal electric light plant of the borough of Etna, Pa. They have also sold a 15-ton Whiting crane, to be installed in the electric light plant of Sistersville, W. Va., tumbling barrel and other equipment for the Union Steel Casting Company, Pittsburgh.

The Bessemer Gas Engine Company, Grove City, Pa., reports sales during November of several engines and compressors to operators in the Joplin district, Missouri, also to Mack Brothers, Titusville, Pa., a 40-hp. engine; Pacific Gasoline Company, Los Angeles, Cal., two 85-hp. direct gas driven compressors for manufacturing gasoline from natural gas; Avery Stamping Company, Cleveland, Ohio, two engines, one of 110 and one of 165-hp.; Carter Oil Company, Sistersville, W. Va., 80-hp. gas driven compressor; borough of Conway, Pa., 50-hp. engine for waterworks.

The Morgantown Board of Trade, Morgantown, W. Va., is winding up the guarantee fund for securing new industries for the town. Owing to its offer for a time of free factory sites, which have the advantage of being located close to cheap fuel, several railroads and good river transportation, it has received many requests for information from new manufacturing propositions and old ones which are crowded in present locations. It is expected that several of these will be secured for the town, whose products along the line of window glass, tableware, brick, stone, etc., are already well known, but the board desires to add other branches of industry, such as foundries, machine shops, iron and steel works, and specialty factories.

The Brownfield-Connellsville Coke Company, First National Bank Building, Uniontown, Pa., put in service last week 32 coke ovens at its Meyers plant, the output being foundry coke.

The bid of the United Engineering & Foundry Company, Pittsburgh, has been accepted by the United States Government for furnishing fenders for the Panama Canal locks. About 1000 tons of material will be required. This is the second Panama contract taken by this company, it having been the successful bidder on the anchorages for the lock gates on which all material was shipped some time ago and is now practically in position. The fenders are protective devices, to ward off the blows of ships swinging against the locks and the main gates.

The turbine reduction gears as installed by the Westinghouse Machine Company, East Pittsburgh, Pa., on the United States Government collier Neptune have operated very satisfactorily, and so far show no signs of undue wear or deterioration. This ship is fitted with a control gear by means of which the turbines can be started, stopped or reversed from the bridge without requiring any action whatever on the part of the engineer.

Five of the 10 hot mills in the Sabraton Works of the American Sheet & Tin Plate Company at Morgantown, W. Va., were started up December 18, and the other five will be started December 26. This plant had been shut down for some time.

A large steel barge under erection for some months at the Keystone Works of the Jones & Laughlin Steel Company, Pittsburgh, was launched last week. It is 200 ft. long, 26 ft. wide, 10 ft. deep, has a carrying capacity of 1100 tons, and has been put in use to carry coal from the mines of the company at California, Pa., to its American Iron & Steel Works, Pittsburgh. This is the second barge of that size which the company has built, and a number of others will be turned out during the winter and spring for its own use.

The Westinghouse Electric & Mfg. Company, East Pittsburgh, has the contract for furnishing the electrical equipment for the 14 steel steamers being built by the James Rees & Sons Company, Pittsburgh, for the Para Rubber Company, a French corporation, which will operate the boats on the Amazon River, Brazil. Two are nearly completed and the others will be built as rapidly as possible. F. C. Ellison, formerly of Pittsburgh, is the general manager of the company.

The statement of the Crucible Steel Company of America for the quarter ended November 30, 1911, is as follows: Profits for September, $306,452.15; October, $459,570.06; November, $374,985.27; total, $1,141,007.48. Deduct charges and appropriations for depreciation and repairs, $339,814.92 and contingencies, corporation tax, etc., $71,482.32, leaves net profit, $729,710.24. This is an increase over the corresponding quarter of 1910 of $65,464.83. Necessary for dividend, $437,500.

On account of increased operations of its Bessemer steel plants and larger consumption of ferromanganese, the Carnegie Steel Company has started up No. 2 Isabella furnace at Etna, Pa., on ferromanganese. The two Lucy furnaces at Pittsburgh are also running on this material.

The Panama Canal Hydraulic Equipment Contract

The Pelton Water Wheel Company, San Francisco, Cal., has been awarded the contract for the hydraulic equipment in connection with the hydroelectric plant at Gatun for operating the Panama Canal. The installation will provide power for operating the lock and gates, lighting, for shops and other purposes. The contract calls for three 3600-hp. Pelton-Francis turbines with Pelton oil-pressure governors; three 10½-ft. pipe lines, three 10½-ft. special gate valves with electrical operating mechanism, and all the necessary hydraulic accessories. The plans provide for vertical shafts with roller bearings on top; the exciters to be mounted on the generator shaft below the rotor of the main generator on each unit. The General Electric Company has the contract for the electrical equipment. J. V. Kunze, manager of the Atlantic department of the Pelton Water Wheel Company, 90 West street, New York, who went to the Isthmus in the interest of his company, has just returned to New York by way of Seattle and San Francisco. He was greatly impressed by the progress which is being made with the work on the canal and the comfort that he enjoyed there.

The Baldwin Works to Have a Western Plant.—The Baldwin Locomotive Works, Philadelphia, Pa., at a meeting of its board of directors held last week, decided to go ahead with the construction of its proposed addition to its erecting shop at Eddystone, Pa., which will almost double the capacity of that plant. The building will require about 4500 tons of structural steel. It also authorized negotiations to be entered into for the purchase of land in the vicinity of Chicago for the erection of a Western plant. While no definite arrangements have yet been made, it is proposed to erect a complete works for the manufacture of locomotives, including a wheel plant, in order to better enable the company to take care of its Western business.

The Isthmian Canal Commission is erecting at Gorgona, in the Canal Zone, Panama, one 2-gross-ton Tropenas steel converter, which is to be used for the manufacture of steel castings for repairs to rolling stock and marine equipment. The commission expects to have the converter completed and ready for operation in January.

Information reached New York this week that Westinghouse, Church, Kerr & Co. have been awarded the contract for the construction of railroad shops for the Canadian Pacific Railway at Calgary, Alberta, which will entail an expenditure of about $2,500,000.

New Publications

Handbuch der Mineralchemie (Manual of Mineral Chemistry).—In four volumes, 8vo. Published by Theodor Steinkopff, Dresden, Germany. Price, 6.50 marks per part.

Each of the four volumes is divided into several parts and parts I and II of vol. I have already appeared. The others are to follow very soon and it is expected the work will be completed in 1914. Each part it sent to the subscribers as soon as published. The editor-in-chief is Prof. Dr. C. Doelter, director of the Institute of Mineralogy of the University of Vienna. Assisting him are 51 contributing editors. They are mostly from Germany and Austria, but almost every European country and the United States are represented, this country by Dr. R. Amberg, Pittsburgh. His paper is on "Graphite, Its Chemical Properties, Artificial Production, Purification and Technical Uses"

The section submitted for review is part II of vol. I. It gives a list of contents of the entire four volumes. Vol. I is divided into five parts. Part I contains a general introduction which includes articles on analytical mineral chemistry and the preparation of minerals for analysis. Next comes a section on carbon, which comprises a general article, one on the diamond, that seems very comprehensive; three on graphite, and one on schungite. Then follow articles on the carbonates, which continue until the end of part III of vol I. The articles on the analytical methods in both this and other sections are given by Dr. Dittrich, of Heidelberg.

The remainder of vol. I and vol. II takes up silica and the silicates. Among other subjects vol. III deals with iron, meteorites, iron oxides and oxyhydrates, followed by articles on the manganese minerals. Vol. IV takes up the precious metals, the minerals containing molybdenum, tungsten, uranium, radium and helium. It has sections in fluorides, chlorides, bromides and iodides, and closes with one on organic compounds.

A brief outline of the way magnesite is treated will give a good idea of the character and thoroughness of the book. In part I, vol. I is a long article by Dr. Linck, of Jena, on the formation of the carbonates of calcium, magnesium and iron, in which, of course, magnesite is considered. In part II an article of nine pages, by Dr. Dittrich, gives the methods for the analysis of magnesium and calcium carbonates. The main article which follows is by Dr. Leitmeier, of Vienna. Full analyses with references are given of 113 samples of both the amorphous and crystalline varieties. The physical properties are next taken up and then the phenomena of dissociation with heat. Following is a discussion of electrical properties, solubility, and finally two pages on the synthesis of magnesite. Dr. Leitmeier's article covers 23 pages. There are two articles of ten and eight pages respectively by Dr. Redlich, of Leoben, on the "Formation and Occurrence of Magnesite and Its Uses."

A special feature of every article is the large number of original references given. The work is evidently being prepared with great care, and will be of much use to chemists, mineralogists, mining engineers and all interested in minerals. G. B. W.

Mrs. Harriet White Fisher, owner of the Eagle Anvil Works, Trenton, N. J., has published a book entitled "A Woman's World Tour in a Motor," giving an account of her picturesque and eventful 23,000-mile trip in an automobile. The book is for sale by the J. B. Lippincott Company, Philadelphia, at $2.20, postpaid.

The House Passes an Eight-hour Bill.—The Wilson bill prescribing an eight-hour day on all work done for the Government was passed in the House of Representatives December 14 by a viva voce vote. The bill provides that every contract for work awarded by the Government shall stipulate a penalty for violation of the eight-hour provision of $5 for each laborer or mechanic required or permitted to work in excess of that time. Section 2 authorizes the President to suspend its enforcement "in time of war or at a time when a war is imminent."

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET.

Rights Concerning Patents.—The existence here and there of resemblances between means employed in a patented device and those of prior patents does not negative patentable invention in the later combination. An inventor of a new and useful combination is not confined to his combination claims unless all the elements are old. If any of the elements are new and useful and show invention these may be claimed and patented. This may be done in a separate patent or by separate and distinct claims in the patent covering the combination, even though such parts are without utility save in combination with the other parts of the device. Upon an absolute sale of a patented device the purchaser has the right to the full enjoyment thereof and an implied license to make repairs, so long as the identity of the original machine is preserved, and such right of repair is not confined to the mere restoring of the part which is defective, but extends to replacing such part unless it is itself made the subject of a patent. (United States Circuit Court, District of New Jersey, National Malleable Casting Company vs. American Steel Foundries, 182 Federal Reporter, 626.)

Necessity for Reducing Contract to Pay Another's Debt to Writing.—If the main purpose of an oral promise by one person to pay another's obligation is to secure a direct, personal and pecuniary benefit to the promisor, the promise is original and not within the statute which requires an agreement to pay another's debt to be reduced to writing. An oral promise by an officer and stockholder of a corporation to pay for goods sold and delivered to it is void within that statute, the benefit accruing to him personally from the sale being remote. (West Virginia Supreme Court of Appeals, Hurst Hardware Company vs. Goodman, 69 Southeastern Reporter, 898.)

Liability for Injury to Visitors Upon Premises.—One in control of premises owes a duty to persons invited thereon to use ordinary care to have the premises reasonably safe. A bridge contractor is liable for injury to persons invited upon the bridge while it is still under the contractor's control, caused by its collapse, if the defective condition could have been known by the use of ordinary care. The visitor, however, must use reasonable care in avoiding danger. (Texas Court of Civil Appeals, Weatherford Machine & Foundry Company vs. Pope, 132 Southwestern Reporter, 503.)

Sufficiency of Notice by Buyer of Defects in Machinery.—If machinery is sold under agreement that, if after 10 days' trial it fails to fulfill a warranty, written notice shall be given to the seller, stating wherein it is defective, notice that the machine is unsatisfactory and that the buyer cannot make it work and desires that it be made to work is insufficient. (Iowa Supreme Court, J. I. Case Threshing Machine Company vs. Gidley, 132 Northwestern Reporter, 711.)

Statements Not Constituting Warranty by Seller.—Statements by a seller which merely recommended the goods sold do not amount to an actionable warranty. (North Carolina Supreme Court, Robertson vs. Halton, 72 Southeastern Reporter, 316.)

Contract Not to Re-engage in Business Enforceable.—The purchaser of a business can enforce the seller's agreement not to re-engage in the same business in the same city for five years. (Maine Supreme Judicial Court, Flaherty vs. Libby, 81 Atlantic Reporter, 166.)

Liability for Injury Caused by Defective Appliances, Etc.—An employer is not relieved from liability to a workman, through a defect in machinery, because he deemed the machinery safe, if the defect could have been discovered on reasonable inspection. To recover for injury or death in such case it must appear that the employee did not know, and in using ordinary care could not have known, of the defect. (Indiana Appellate Court, Ittenbach vs. Thomas, 96 Northeastern Reporter, 21.)

Pittsburgh Steel Company Furnaces

The Pittsburgh Steel Company, Pittsburgh, has placed a contract with the Garrett-Cromwell Engineering Company, Cleveland, for the erection of two 500-ton blast furnaces and a merchant mill at Monessen, Pa., where the former company's eight open-hearth furnaces and blooming, rod and wire mills are located.

The Production of Oil in 1910

More than 200,000,000 barrels of oil, with a value of nearly $128,000,000, was produced in the United States last year, according to David T. Day, of the United States Geological Survey, in an advance chapter on petroleum from Mineral Resources of the United States for 1910. He says that the petroleum industry in the United States has been characterized by a phenomenal increase each year for the last four years. Varying between 50,000,000 and 60,000,000 barrels annually in the decade between 1890 and 1900, in 1903 it passed the 100,000,000-barrel mark and in 1904 was over 170,000,000 barrels. It was 178,000,000 barrels in 1908, 183,000,000 barrels in 1909, and 209,556,048 barrels in 1910, a gain of 14 per cent. over the record output of 1909.

United States Leads the World

The United States produces more oil than all the rest of the world together. In 1910 the wells of this country yielded nearly 64 per cent. of the total production, Russia scoring a very poor second with about 70,000,000 barrels, or 21 per cent. The production of other countries is comparatively negligible, the third on the list, Galicia, contributing only 3.87 per cent. of the total.

The excess of the petroleum production of the United States over the normal demand is shown by the fact that the 209,556,048 barrels produced in 1910 brought a smaller return—$127,896,328—than the 183,170,874 barrels in 1909, which was valued at $128,328,427. The even smaller output in 1908, 178,000,000 barrels, was valued at still more—$129,079,184. As the production has increased the average price has gone down from more than $1 a barrel in 1900 to 61 cents in 1910.

These repeated increases in oil production have been due to the successive development of four great petroleum fields farther west than the old productive centers. By 1900 the country had adapted itself to the influx of oil from western Ohio and Indiana; then came in rapid succession the development of the Gulf field in Texas and Louisiana, the Mid-Continent field in Oklahoma and Kansas, and the Illinois field. In the meantime California's production had been increasing so rapidly that it became the dominant feature of 1909 and 1910, outstripping the production of any other State and promising to retain this supremacy in the future.

California the Largest Producer

California heads the list of producers in 1910, with 73,010,560 barrels of oil, an increase of 17,538,959 barrels over the production in 1909. This output is more than twice as great as that of Pennsylvania for any year, and is greater than that of any foreign country; in fact, the production of petroleum in California and Oklahoma combined is practically equal to the entire foreign production. The average price per barrel of California oil in 1910 was 49 cents. The increased use of fuel oil in 1910 over 1909—more than 23 per cent.—was due largely to California's energy in pushing the sales to the northwestern railroads.

The second among the oil-producing States in 1910 was Oklahoma, with a production of 52,028,718 barrels. The third largest producer was Illinois, with 33,143,632 barrels. Other heavy producers were West Virginia, 11,751,871 barrels; Ohio, 9,916,370 barrels; Texas, 8,899,266 barrels; Pennsylvania, 8,794,662 barrels, and Louisiana, 6,841,395 barrels. Louisiana's production has been notable, the increase over 1909 having been 123 per cent. as a result of the development of the new gushers in the Caddo field.

On petition of certain creditors, Charles B. White has been appointed receiver for Paul S. Reeves & Son, manufacturers of brass and bronze castings, Philadelphia, Pa. The receiver has been authorized to conduct the business for 60 days, after which a report of the affairs of the concern will be made to Judge Holland, of the United States District Court.

The Hamilton Iron & Steel Company's blast furnace at Hamilton, Ohio, which was offered at public auction December 14, was bid in by D. M. Peters of Hamilton, chairman of the bondholders' committee. His bid was $375,000.

The Dwight & Lloyd Ore Sintering Process

George W. Maynard, 20 Nassau street, New York, special representative of the American Ore Reclamation Company, furnishes the following information regarding the special field of usefulness for the Dwight & Lloyd system of utilizing high grade concentrates of magnetic iron ore:

The magnetite deposits in the Eastern States have their largest development in New Jersey and in northern New York. In the New Jersey Geological Survey's report for 1911 the number of magnetite mines and deposits is stated to be 366, of which a relatively small percentage produces ore of high enough grade for the blast furnace without close sorting. In the Adirondack and Lake Champlain districts there are large deposits which have been worked for many years and are still important producers of ore of high enough grade for shipment without close sorting, but the number of low grade deposits is in excess. The occurrence of apatite, lime phosphate, formerly a deterrent factor in some of the large deposits, has now become a source of profit through the adoption of magnetic separation and concentration so successfully carried on at the mines of Witherbee, Sherman & Co., near Port Henry. The percentage in the finished product ranges from 64 to 65 per cent.

The Dwight-Lloyd process for utilizing high grade concentrates is essentially automatic and continuous, the output depending upon the regularity of feed, which in the case of magnetites will average about 100 tons per day for each machine. The working costs are embraced in power, fuel intermixed with the ore, labor, repairs and royalty. The resultant product is a sintered cellular mass presenting an exceptionally large surface to the ignited blast furnace gases and an increased output over compact lump ore. The results obtained in the treatment of blast furnace flue dust have been eminently satisfactory and have been most favorably commended by a committee of the United States Steel Corporation.

Tests have been carried on for several weeks at the American Ore Reclamation Company's works at Birdsboro, Pa., where sample lots of ore may be sent for tests. The size of the grains of ore will depend upon the mesh necessary for the separation of the gangue in the magnetic concentration. About ten barrels of ordinary capacity will usually be sufficient for a test. Apart from the freight charges, the tests will be made without cost to parties intending to investigate the process. The Reclamation Company will install plants at the actual cost of erection and will furnish working drawings. The adoption of the process will be based on a tonnage royalty during the life of the patents.

Samples of the sintered ore and flue dust may be inspected at the office of the company, room 1908, 71 Broadway, or at Mr. Maynard's office, 20 Nassau street, New York.

The Newark Foundrymen's Association

The Newark Foundrymen's Association, Newark, N. J., at its meeting held December 13, was addressed by George Heggie, instructor of foundry practice in the Newark Technical School and instructor in pattern making in the Stevens Institute of Technology. Mr. Heggie had for his topic: "The Effect of the Various Constituents on the Quality, Structure and Physical Strength of Cast Iron." He said his purpose was to give the foundrymen an idea of what he is teaching his Newark class in foundry practice. The students under Mr. Heggie are actually engaged in foundry work as journeymen or apprentices, and he deplored the fact that there are so few schools of a similar character in the United States. He extended the scope of his address and also answered many practical questions from the members. He touched upon the crystallization of iron under various conditions; results of different temperatures in pouring and of fast and slow cooling; mixtures of two or more irons; proportions in cupola charges and the matter of widely differing strength in castings made from mixtures whose analyses show practically the same constituents. He showed specimens to illustrate his points.

Franklin Phillips, of the Hewes & Phillips Iron Works, president of the association, presided over the meeting.

What the Foundry Thinks of the Machine Shop*

A Frank Talk by a Practical Foundryman

BY H. M. RAMP†

I have been asked to tell, among other things, what the foundry thinks of the machine shop, and I am frank to confess that this is a question I approach with fear and trembling. I do not believe it would be either wise or judicious to tell all that the foundry thinks at all times. I am afraid the emotions held by the foundrymen when some casting had been discarded had better be suppressed.

Close Relations Between Foundry and Machine Shop

Now it probably would be a serious mistake to tell how the foundry felt part of the time, but it is not amiss and may redound to the good of all to tell how the foundry feels most of the time and during its sane moments. The relationship between the two is close and indivisible. The foundry is the father, the parent, of the machine shop, and yet I am not surprised at its offspring disowning the parentage at times. It is the greatest source from which the machine shop draws its supplies that produce the perfect machine with its exceptional performance and beautiful finish. It supplies the product in the rough, like old mother earth supplies the diamond before it reaches the cutter's tool, which releases and shows forth its true beauty. It is the foundation work for your drill, planer, milling machine or any other finished mechanism.

If your castings are good your machine has a proper foundation; if your castings are poor you have built your house upon the sand, that involves much patching and excusing, and that injures the efficiency, the sole aim and the beauty of the finished product. This the foundry knows and realizes, and yet it often falls short of what it should perform; it is often guilty of grave mistakes and criminal negligence; it often neglects points of special value to the machine shop and sometimes appears to ignore the customers' demands. All these things are true, as they are true of human nature wherever you meet it, and the reason it appears worse in the foundry than elsewhere is because more of the details of labor are done by individual effort and without the assistance of machinery that the more favored trades possess.

The Foundry Neglected as Compared with the Machine Shop

While the foundry deserves much criticism and correction, it has never had the attention, the brains, the research work, the finances poured in upon it that the machine end of the iron industry has to elevate and develop its possibility. It has been considered more as a necessary evil than as a branch of the business that could be mastered and developed and controlled. The foundry until the last few years has been the last place to receive improvements and advice, and it is not as yet burdened with a load of either.

The individual who entered the foundry as a life's business was always regarded as sinking his intellectual or mechanical abilities, if he had any. The foundry has been demeaned and often referred to as a place where the qualifications are "a strong back and a weak mind," and yet there is no business under the canopy of heaven that requires greater judgment and a more thorough knowledge of fundamental principles than the art of molding. When properly done it most certainly deserves to be classed as an art and yet this is the atmosphere in which the foundries of our country were developed and the foundrymen of our country were made until the past few years, while the machine shop was commanding the gray matter and finances of the brightest men in our land.

It is strange that you have so many complaints about your castings. It is strange that the results are not always what were anticipated. It is curious that one foundry can make a certain line of castings acceptably and completely fail on another. This prejudice against the foundry in the past, as a place of dirt and grime fit only for occupation by hewers of wood and haulers of water, has done much to retard the development of the foundry business and to keep the bright, ambitious and energetic men from mastering its science. But these are not the only reasons why the foundry fails to give the machine shop what it asks.

If you wanted a perfect job of drilling would you give the mechanic a drill that did not run true? If you wanted to plane a surface accurately would a defective planer be used? If a job had to be bored or milled to a close fit would anyone use a tool whose bearings had several hundredths play? No. It would be seen to first that the tools were accurate and true, and if they were not good enough, and could not be made good enough, money would be spent and new ones would be purchased.

Patterns Are Not What They Should Be

The machine shop is constantly adding to its standards of accuracy and efficiency by the purchase and use of the most improved tools and it is getting results. But how many buyers of castings are adding to the efficiency and quality of their pattern equipment† All are seeking better castings, and justly too, but how many are seeking to better and maintain their pattern equipment so that the foundryman can have the same assistance to make better castings in the foundry that the machinist has to make better work in the machine shop? Even among those who are trying to do this very thing how often the constructive features of the patterns are under the direction of some one who has not the knowledge of modern foundry practice or the time to acquire it, and the effort expended returns small interest on the capital. I have often heard the remark, "We made a new pattern for that casting, but we never got any better results," and investigation invariably proved the pattern was not made right.

When the machine shop seeks to improve its tools or methods it does not put blacksmiths or candy makers on the job—it uses the best educated brains and experience in the machine business that money can buy. Yet too often the pattern, the very foundation of the foundry's work, is constructed as the designer, the pattern foreman, the engineer directs, without even consulting the experience and preference of the foundry, and in as great a measure as this prevails just as great is the handicap placed upon the foundry.

We often see standard patterns made of wood for castings to be molded by the hundred, and then we see the machine shop spend much money for rubbing and filing and filler and painters. It would be far more profitable in many cases for first-class iron patterns to be made, both for machine shop and foundry, and provide a fitting and correct model for the monument of beauty and utility you are erecting.

The Machine Shop Tries to Save Too Much on Cost of Patterns

The average patterns in the average foundry to-day are not made as good as they were 10 years ago. The average customer cannot afford to spend money for good patterns to produce good castings, but he can afford to spend money for improved machinery in the machine shop to better the quality and cheapen the cost of the finished product. Too often he holds the initial cost of the pattern so close to his eye that it obscures the entire horizon of his vision, and when he fails to get the beautiful casting he pictured in his mind's eye he cannot understand why the foundry makes no progress.

The machine shop makes templates and gauges of iron and steel, with careful and elaborate provision for their care and protection. To the foundry is furnished a pattern of wood, often lightly constructed, sometimes of green lumber, and after it has been hauled from shop to shop for eight or ten years, it is stored in old sheds, or back of sand heaps. The foundryman is hauled over

*Address before the Superintendents' and Foremen's Club, Oakley, Cincinnati, Ohio, November 23.

†Superintendent Modern Foundry Company.

the carpet and arraigned, first, because the castings are not true, and, second, because the pattern has been abused. Is it any wonder that castings come out of shape at times? Many machine concerns have inspectors who check up every piece of work done in the factory. Some have inspectors who check up every gauge and template at stated periods to discover error and prevent mistakes; but did you ever see a concern check up its patterns periodically to know that they were true? Usually it will be done after having to reject a bunch of castings, and only then is the pattern found to be at fault.

There is one reason greater than all others why foundries should have much better patterns than formerly. The trend of the times is to reduce the skill demanded in the individual and put more dependence in the improved machinery of to-day. This is as true in the foundry as elsewhere. We do not make the molders we did 20 years ago, and the patterns that the foundries get are their improved machinery or the old-fashioned tool as the case may be, and are the positive foundation for their product.

I could talk of pattern troubles for an hour. I could tell you of the man who had a wooden pattern that he used almost continuously for 12 years, and he couldn't understand why it is not right now. I could tell you of another who spent over $100 in having a pattern filed up in the machine shop and couldn't understand why the castings came thin. In fact, I could go on and talk until I would gain as unenviable a reputation as Eli Perkins.

The Designer Worse than the Pattern Maker

But the pattern maker and his patterns are not the only thorn in the flesh that the foundry possesses; there is another and greater than he, one whose commands carry more grief and pain. It has been aptly said "that the pen is mightier than the sword," for where, oh where, would you find the sword with which to make the foundryman do what he does in obedience to the pen in the hands of the designer. It is fortunate, indeed, that the designer does not know all that is said of him; he wouldn't sleep well at nights; warm, indeed, would be his couch. He is regarded as the foundry's natural enemy, and the reason is not always hard to find.

I have seen many castings designed that were perfectly fitted for the purpose for which they were made, but were so designed that the molder could not make a perfect casting, for the excessive strains due to unequal proportions made the castings crack or warp, or required special treatment that kept the foundryman in hot water from the time the job came into the shop until it was out. It is easy enough to say we do not need any more metal at this or that point; it is very creditable to be able to design a machine with the maximum utility and the minimum weight, but there are certain fixed, unalterable laws in the shrinkage or contraction of cast iron that are not studied as closely by the designer, or at least considered, as they should be.

I have seen many castings command a higher price simply because they were designed with a view to saving metal, where, as a matter of fact, the saving in metal was more than lost in increased price. The foundry gets very little opportunity to protest against designs that are difficult to mold, and seldom is it consulted. The machine shop may protest and get changes because of high machining cost, but rarely does the foundry get concessions because of high molding cost. If the foundry was consulted more by the designer both would be benefited to no small degree. It may seem incomprehensible that any good could come out of the foundry, but I want to tell you the practical man in the foundry can pass better judgment on the freaks and fantasies of cast iron than the finest designer in the land, and it is to the everlasting loss of both if they do not swap stories and criticisms over every new designer.

The Quality of the Iron a Vexatious Subject

There is probably no one single item in foundry practice that gives the machine shop more anxiety and the foundryman more cause for reflection and grief than the quality of the iron that enters into their castings. By quality I do not mean a definite standard, for that has never been fixed except as to a few essentials as to strength and softness, but rather the quality demanded by the individual customer. This is likely to vary in accordance with the angle he views it from. If he has been studying shop costs and trying to get a big output, his iron is sure to be hard; if he has had breakages on his machines and had to make replacements, it is sure to be weak; if his agents have been around criticising his product it is sure to be open grained, and the immediate trouble is always the greatest, and the poor foundryman rushes from one extreme to the other trying to attain an impossible result. I have seen a customer accept an iron as all right one day that he would complain of the next. I have had customers tell me every time they talked of iron of some remarkable stuff they got from Brown some years ago, until I wondered if their comparison was not like mine with the old spring water at home.

This trouble, this uncertainty, is caused because there is no definite standard for the commercial qualities of cast iron. What is soft for one is hard for another; what is open grained for one is pronounced fine by a different user, and we are expected to grind all the different requirements out of the same mill, and this very condition I believe prevents, yes and prohibits, a definite standard being ever adopted.

The Ideal Iron for the Machine Shop

The first and greatest demand made upon the foundry by the machine shop as to the quality of cast iron is its ability to be machined easily. Some I expect will deny this, but as a broad principle I believe I am correct. Furnish a machine shop with iron that will stand 35,000 lb. tensile strain and let it add 20 per cent. to the cost of the machine operations and you would hear a mighty roar. Furnish a machine shop with iron that would necessitate the reduction of 20 per cent. in all cutting speeds and I do not care if it did show a grain like polished nickel, you would be compelled to change it. The strength and fine grain are highly desirable and the machine shop wants them both, but the finishing labor must not be affected to procure it.

The ideal iron for machine-shop purposes should possess the greatest possible strength, the finest possible grain and be easily machined at the highest possible speed. This, I say, is the ideal iron but it is impossible of attainment. Strength, closeness of grain (which I will hereafter refer to as density) and softness are not qualities that bear a close relationship. Great strength and great density represent hardness, the exact opposite of the machine shop's greatest requirement. This is controlled by the laws of nature and cannot be altered.

There are certain chemical compounds of iron and carbon that give greatest strength and greatest density. There are also certain chemical combinations of iron and carbon that give the greatest softness, but with them are invariably associated weakness and open grain. There are other elements that enter into combination with cast iron that have a bearing upon these qualities, but of these I will not burden you to-night, for the king of them all is carbon, the same element that makes the diamond and the charcoal. These chemical combinations occur along fixed lines and never vary but are so susceptible to change on account of heat treatment and the rate of cooling that no fixed standard can be made.

A casting is harder on the surface than under what the machinist calls the scale, and the deeper you go the softer and more open it becomes. This is caused by the rate of cooling. The iron that comes in direct contact with the sand cools more quickly and forms a different combination of iron and carbon that makes the increased hardness. Some machinists attribute the scale on cast iron to the sand that burns to the casting and in some cases this is true, but a casting from which every grain of sand has been removed by the sand blast will show the same variation. You have often seen a casting soft enough to machine all over except some thin corner or lug that would refuse to cut. This also was caused by the rate of cooling. The fault did not lay in the iron. The same iron was in the part that could be machined that was in the hard place.

Why Castings Cannot Be Made with the Iron Uniform

The foundry is often asked the question, "Why can't you make your iron uniform? You give us some castings that machine all right and others upon which we are compelled to reduce our speeds." If we gave you iron that

was exactly uniform you would have to design every casting with the same thickness of section throughout, and the foundry would have to make a different mixture for every variation in section. That is what absolute uniformity would mean. Of course, this is an overdrawn picture, but yet it is true. What the foundry really does is to keep as far on the soft side as possible without too much injury to the strength and density, and the lack of uniformity is often due to the rate of cooling of the different sections.

I have heard talk in machine shops the past 10 years of the adoption of some standard for testing the hardness of cast iron, and have listened to many discussions as to what was the best method to adopt, but the same condition that confronts the foundry in making castings uniform confronts the machine shop in adopting a method. What will be the standard? Every variation of section, no matter how slight, represents a different degree of hardness. One part of the casting might pass the standard and another part of the same casting fall below. On the surface it might register too hard and 1/32 in. deep prove all right; would the scale of the casting be taken as the test for hardness or under the roughing cut? These are the natural laws that govern the hardness of castings and you cannot change them, and wide, indeed, must be the range of any test that can take cognizance of this varying quality.

Hard castings in the machine shop give the foundryman a variety of emotions. He may find he received a car of inferior coke to melt his iron with; he may find a car of iron below grade; he may find his cupola tender has not followed instructions and grown careless, but these are his own particular woes. When he goes in the machine shop and finds that the steel has not been tested that is used to cut his iron, and all the satisfaction he can get from the foreman is, "We always buy Novo Superior or Double Rex A, and it is always right; we always cut 70 ft. per minute with it," he wonders why steel men are infallible and foundries never. He sees a farm hand running a machine and sharpening his tools as if he was sharpening a hoe, and he wonders if there is any science in the art of tool grinding. He sees another man deliberately crowding his machine and burning up his tools so that he can demand an allowance for hard iron and he goes back to the foundry with his heart full of tears and his mouth full of profanity. The great part of the hard iron is made in the foundry, I grant you, but there is some of it made in the machine shop and in the designer's office.

Density the Second Greatest Requirement

The second greatest requirement in cast iron—I now speak of local factories—is density, closeness of grain, and of all the elusive, uncertain qualities to manufacture, this is the worst; it also has no standard but the eye and mood of the consumer. Density and softness, as before stated, are produced through opposite combinations of iron and carbon. They are in no sense allied. As the grain grows denser the iron becomes harder. Of course, there are cases that are an exception to this rule. We have seen iron both open and hard which is brought about by another and a rare heat condition. But the natural characteristic is closer and harder.

The density of cast iron in machine-tool castings is a never ending subject for discussion and criticism. The consumer always has this issue snugly tucked away to spring at a moment's notice when he has a rainy day or the foundryman grows a little too conceited. There are many reasons for this trouble, the principal ones being as follows:

First and greatest, the foundryman tries to make his iron soft enough to satisfy the cutting speed and gets it too open. This is the most common error.

Second, the customer does not take into consideration the varying section of the castings, for what is true as a law of hardness or softness in the different sections of cast iron is just as true in regard to the density. A ½-in. section that would polish like steel would show an open-grained iron in a 2-in. section; and yet many heavy tool castings are made where a ½-in. section must be soft enough to machine and another part of the casting with a 2-in. section be expected to come dense and fine grained. Here is the place where they catch the foundry coming and going.

Third, the amount of finish plays an all important part. The less metal there is removed from a casting, the more dense will be the surface. This accounts often for the variation found in a number of similar castings poured by the same foundry. It may have been that some of the castings were strained and a little thick, and the machine shop had to remove more metal on some than others to bring them to size, or the machinist may have been careless in setting up his work and took too much finish from the show side of the casting. Both these causes would make the iron show a decided difference in density.

Fourth, the grain of the iron can be affected by the depth of the finishing cut and the cutting qualities of the tool used. I have seen iron that was torn out by an improperly ground tool until it looked frightful develop into a thing of beauty when the tool was properly ground and another cut taken. I do not presume to give any advice on tool grinding, but I do know the tool must cut, not tear, if the best finish would be obtained.

Of course, there is no question that the cupola practice and the careful mixing and blending of the different grades of iron in the foundry have much to do with the bringing together of the opposite qualities of softness and density, but the underlying principles I have stated here are the foundation work of the whole question. I have tried not to exaggerate the machine shop's criticism.

Chemical Analysis Misused

These are the two most important qualities that the machine shop demands in cast iron, but, of course, there are special castings in which the qualities of great strength, great hardness, great wearing life, or resistance to corrosion are the important features, but they occupy so small a relative portion of the output that I have not time to speak of them to-night. But one thing more about iron. To-day we are living in the age of chemical analysis. The chemist takes about as much iron as you could carry on a 10 cent piece, and tells you what a whole carload is good for. Every modern foundryman to-day uses his services, and when the customer complains he pulls out the chemist's report and says, "Oh, no; that iron can not be hard, it analyzed so and so," but there is just about as much reliance on the report of the chemist to determine this question as there is in the broad declaration of the machine shop that it buys some special brand of tool steel and it must be right.

There has never been an innovation in foundry practice that was more thoroughly misunderstood and misused than chemical analysis. Its use has obscured a dozen other things that have a direct influence upon the quality of cast iron. In the first flush of its partial attainment as a regulation of the qualities of cast iron, it has too often been accepted as the panacea for all its ills.

Chemical analysis does tell the amount of the different elements present. It does give us a compass that points the way broadly. It does tell us when the elements are radically wrong. But it does not tell whether a casting is hard or soft within the limits prescribed by the machine shop, because every man's standard of softness is different. It does not, because chemical analysis is the same if used in a ½-in. or a 3-in. section. It does not, because the varied rate of cooling has little influence on it. It does not, because it cannot take account of certain injuries that can be wrought to iron in the blast furnace in the making or in the cupola in the melting. It does not and cannot take into consideration the heat treatment and cooling influences that cast iron receives. It can only be used as a signboard to point the way upon an unbeaten prairie, not as a definite highway that leads to Rome. Understand me: I do not disbelieve chemical analysis nor seek to discredit it, but I say laboratory analysis cannot give you all you want; it must be used as a means, not as an end.

"Foundry" and "Trouble" Synonymous

A foundryman's life is particularly colored with complaints. I have often made the assertion, and still believe it true, that there is only one word in the English language that is synonymous with foundry and that is "trouble." When the foreman of the machine shop sees the foundryman coming through the shop with a smile on his face, which, however, is a rare sight, he thinks to himself, that fellow has no business to be happy, and he pours out a tale of complaints that soon reduces him to his natural condition of despair. The causes for complaints are many,

and in most cases are well founded, but is it any use to tell the foundryman that his entire product is rotten because he loses heavily on one or two castings? Is it any use to tell him that the castings you are now getting are worse than you ever got before, when both you and he know differently? So is it any use to throw up both hands and say the whole business is going to the infernal bow wows, and then turn round and use the castings you complained of?

No foundryman makes a casting bad purposely. He feels more keenly over the bad casting than the customer. He is constantly fighting to correct the complaints he hears and to improve the quality of his product, and this habit or custom which sometimes prevails of constantly complaining, constantly depreciating his work, with the idea of whipping him to greater achievements, befogs his judgment on the improvement he has made. If the customer would bestow credit when credit was earned with as free a tongue as he can give criticism, he would receive better castings and more heartfelt service. In some cases I believe the disposition of the machinist to kick against the foundry is as deeply ingrained in his disposition as the miser's love of money.

No Standards in Foundry Practice

As I have said before, there are no standards in foundry practice. Every foundryman is a law unto himself. Every man does his work differently in the essentials. The machine shop has a certain broad ground upon which things are standard. There is not a book written to-day that tells you intelligently what to do in a foundry. There is no set of rules adaptable to more than one foundry. There have been people who tried to reduce foundry operations to paper, but they have generally stayed on paper. There is no uniformity of operation. I do not say there is not a possibility of standardizing foundry performance, but I do say that the customer stands in the way as much as the foundryman. When the machine shop sets a definite and intelligent standard upon its castings; when it furnishes a suitable and a standard pattern, then one great step will be taken in the right direction. This lack of standard not only hurts the foundryman but it hurts the customer. One man wants a pattern made one way and the next one a different way, and that is why one foundry makes castings with less finish than another.

The builders of machinery are constantly seeking to surpass each other. They use high-priced experts. They watch each other's product. If they would apply a little of this treatment to their casting requirement they would force the foundries to standardize on the best practice, or the weak ones would go out of business. In the foundry itself there is a longer and a greater battle to fight. How can you standardize the strength of one man's arm behind the rammer with another? How can you standardize the clear judgment necessary in some molding operations? How can you standardize the various intellects that go to make up a foundry organization?

The answer is this: Make it a place like the machine shop where the work is done by machinery. Little progress has been made in foundry development except as to buildings and a few machines. Replace the skilled touch, the element of personal judgment, with mechanism as was done when the lathe and planer replaced the file and chisel; use money and brains as liberally as they have been spent in the machine shop, and you will see a change come in the accuracy and quality and appearance of the castings not deemed possible to-day. The foundry is in its infancy, yet it is the oldest trade recorded, dating back to the time of Tubal Cain. It has a future just as great as the machine shop, but the door to it must be opened by those who are willing to stand the expense and endure the hardships and privations of the pioneer and explorer.

After the regular semi-annual meeting of the Empire Steel & Iron Company, December 12, it was announced that no action had been taken on the dividend on the preferred stock. Nothing was said at that time of another meeting, and lack of action may mean the same as passing the payment. The company now owes 24 per cent. in back dividends. In June of this year 1 per cent. was declared, and in December of 1910, 2 per cent. On July 1, 1910, the full 3 per cent. was paid. If the dividend for the last half of the current year is not paid, it will mean that the preferred stockholders will have about $400,000 in back dividends coming to them. The low price of pig iron is given as the cause of the company's diminished profits.

Engineering Data

One of the most interesting developments that has come about with our modern systems of great industrial manufacturing combinations and immense and specialized factories has been the production of pamphlets, bulletins, etc., dealing with the technical applications and aspects of the company's products. In the main a considerable amount of thought has been devoted to the preparation and distribution of this matter. Series of bulletins are arranged which cover the use of a certain mechanical unit in the different fields. Results of authenticated tests, curves and tabulated figures are given so that the engineer utilizing the material may know what to expect under actual working conditions, aside from any selection from the lists of sizes or capacities that his judgment may indicate.

It was at first undoubtedly true that these bulletins, which must not in any way be confused with house organs or publications composed mainly of interesting or self-interest reading matter, contained material that was more advertising and laudatory in its nature than replete with concise technical information. It soon became evident, however, that the engineer desired definite, concrete statistics concerning the materials and products with which he was dealing. The bulletins accordingly comprised more and more such specialized literature until today they constitute a genuine contribution to the fund of knowledge of the world.

The very desire on the part of the manufacturer to be able to place gratuitously at the call of actual or potential customers all available data caused him to undertake many investigations along lines that might otherwise have been neglected or undeveloped. These researches have been conducted on a scale impossible for the individual or even the engineering schools, due to the lack of funds or time available. That the reasons for such endeavor are in the main selfish is undoubtedly true, but there is, nevertheless, thereby accumulated a vast amount of informing matter and the data are usually backed by the willingness of the makers to have their engineers and experts co-operate personally and fully with the staff of the purchaser concerning any questions which may arise.

For some time the Hyatt Roller Bearing Company, Newark, N. J., has made a practice of issuing bulletins covering in detail the ratings and capacities, indicated uses and actual application of its flexible roller bearings. Separate issues cover the different types, such as the long series of machine tools and similar work; short series, for automobile service; those employed in standard shafting boxes, and those for special work in cars used in the transportation of passengers, freight and mine products. Forms for the entry of questions or specifications are also provided, and with the carefully arranged tables in the bulletins make it easy to procure the proper bearing for the particular instance. These bulletins are at the call of any interested and form a collection of special information worthy of a place in any engineer's office.

An Effective Advertising Device.—The value of automatic screw machines is being very convincingly shown by the National-Acme Mfg. Company, Cleveland, Ohio. A letter referring to the subject is inclosed in an envelope provided with an eyelet fastened securely in one end of the envelope. To this is tied the model of the new Namco self-opening die for use on machines where the threading tool is revolved. It is difficult to describe the piece clearly, but a duplicate of the model can probably be had for the asking, particularly by makers of articles from bars of metal. The multiple-spindle method is employed in manufacturing the part, and it is claimed that it saves 20 to 60 per cent. of the cost of manufacture, resulting in the production of an article of potential difficulty by what is explained as one operation with one set of tools. As a telling way to emphasize a meritorious manufacturing method, the idea of a model attached to a letter is successful. It undoubtedly attracts the recipient's attention.

J. BECKER & SONS.
Mechanical and Civil Engineers,
PITTSBURGH, PA.

A 15,000-hp. Coke Oven Gas Engine Plant

Purification and Utilization of Gas from By-Product Coke Ovens at Alsdorf, Germany

BY C. A. TUPPER, MILWAUKEE, WIS.

When by-product coke ovens are located near large cities the gas can usually be sold to advantage for illumination and as fuel; but in the absence of such opportunity it can undoubtedly be best utilized for the production of power. Abroad, and particularly in Germany, the problems connected with doing so have thus far been worked out quite thoroughly.

In the accompanying reproduction of a recent photograph, Fig. 1, is shown the interior of the electric power station of the Eschweiler Mining Company, at Alsdorf, near Aachen, Germany. It is the largest power plant in the world to be operated on coke oven gas. The origin and successive development of this station, located at what is known as the Anna No. 2 shaft, form an instructive example of how a company operating by-product coke ovens, whether in connection with mines or blast furnaces, is able to cover all of its power requirements in a most economical way by taking full advantage of modern engineering progress.

For the mines and other works of this company, as in many of the European colliery districts, the gas from the coke ovens was originally used as fuel under boilers, and the steam thus generated supplied a number of isolated steam-engine plants scattered over the considerable area of the companys operations. For these comparatively small plants the running and maintenance costs were relatively high, particularly as the management felt under the necessity of carrying a spare engine in each location, and the condensing losses in the long feeder pipes from the boiler house were very heavy. The obvious remedy for such conditions lay in the construction of a central electric generating station and the complete electrification of the company's operations. When it came, however, to the question of deciding upon the type of prime mover to be installed the verdict was in favor of gas engines rather than the continued use of steam, for the reason that, with a steam engine of the most efficient type ordinarily used, it is only possible to convert into power about 15 per cent., as a maximum, of the calorific value of the gas, while with gas engines as much as 30 per cent. can be realized. The company accordingly determined to dispose of the steam engines, one after another, and gradually concentrate the production of power in a gas-engine-driven electric plant.

The gas then being used under boilers would not, however, do for gas engines, and the next problem was to secure a gas sufficiently free from impurities to serve this purpose. A by-product recovery plant having been decided upon at the same time, this would take care of the question of tar compounds, as well as some other deleterious substances; but the necessity of extracting a large percentage of sulphur remained, and to provide for its effective removal a special cleaning plant was constructed, which consists primarily of layers of bog iron ore on coarse wooden lattice work. Through this filter the gas is forced by fans, the gas forming sulphides and ferrocyanide and the noxious elements being removed. Every few weeks, as the ore becomes saturated, it is dumped from the racks into the central chamber shown by Fig. 2, where regeneration takes place from exposure to the air. The two sides of the filter are operated alternately, so as to afford opportunity for this freshening process. Tar extractors were originally used, but were found unnecessary after the installation (as

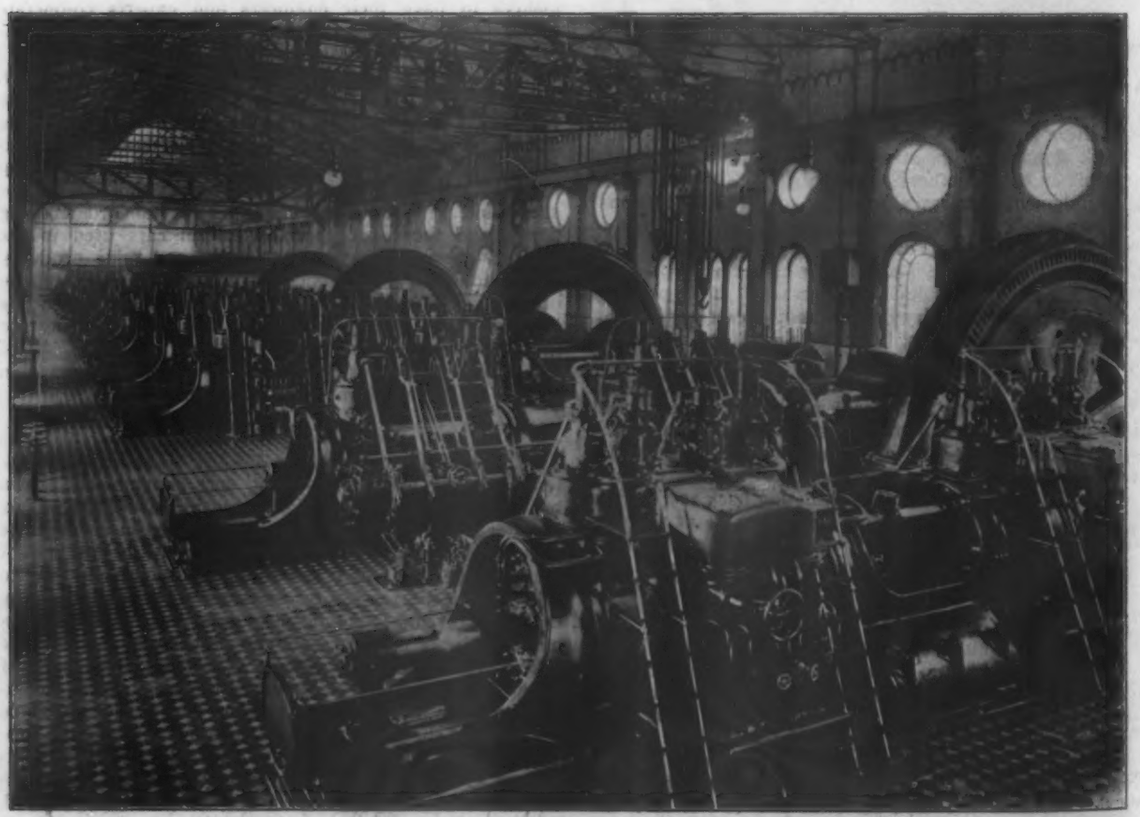


Fig. 1—Eschweiler Mining Company's Power Plant, Alsdorf, Germany, with 15,000 hp. of Augsburg-Nürnberg Gas Engines Using Coke Oven Gas

the writer recalls having been told by some one connected with the plant) of new Koppers ovens, substituted for an older type. The gas as cleaned has a composition approximately as follows:

Carbon dioxide	2.00 per cent.
Hydro carbons	1.40 per cent.
Oxygen	0.82 per cent.
Carbon Monoxide	5.82 per cent.
Methane	20.83 per cent.
Hydrogen	55.11 per cent.
Nitrogen	14.02 per cent.

It will be noted that there is a very high percentage of hydrogen, but no trouble has been experienced. From the filters the gas can be sent through the connections shown in the plan, either to the gas engine house or to one of two gas holders, having a combined capacity of 52,500 cu. ft., from each of which two separate lines lead to the power plant. To provide for the removal of water condensing in the pipes, there are two drain-off valves in each line. Each cubic foot of the gas, as cleansed, weighs about 3/10 lb. and has a calorific value of 340 to 450 B.t.u. This gas costs to produce about ⅛c. per kilowatt-hour, from the time that it is taken as coke-oven waste and delivered to the engine cylinders. To insure a supply of power when sufficient of the ovens are not in operation to provide it, gas producers have been installed as auxiliaries.

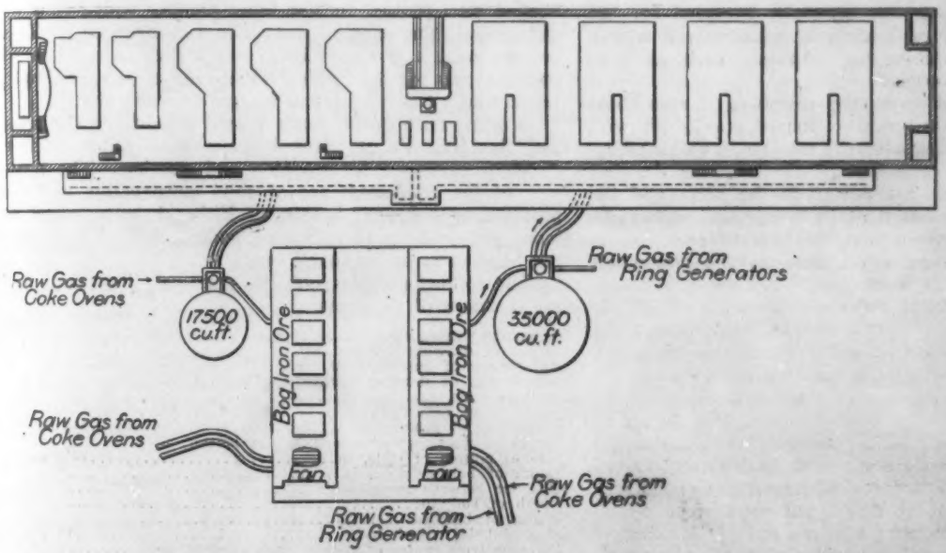


Fig. 2—Sketch of Lower Plant and Coke Oven Gas Purifying and Storage Arrangements

In the power plant, which was designed for indefinite lateral extension, there were installed, as the initial equipment, two gas engines of 500 hp., each direct coupled to three-phase alternators. These were notable at that time as the first large gas engines of the double-acting type. The units installed by the Eschweiler Mining Company were used by their builders in carrying out extended experiments and tests to determine upon a scientific basis the best conditions to be obtained for parallel operation, and these formed the basis of future practice.

The first two units were so efficient in service that three more were ordered, two of 1000 hp. each and one of 1200 hp. Later two twin-tandem engines of 2400 to 2600 hp. each, and still later two twin-tandem machines of 2600 to 2800 hp. each were installed, making the present capacity total 14,500 to 15,000 bhp. These engines are indicated by Fig. 2 in the order of their installation, beginning at the left. The small and medium-size units, or first five, were provided with separate fly-wheels, while each of the four largest has a heavy fly-wheel rotor included in the design of its electric generator.

The gas-power account is separately kept, and a charge approximately ¾ cent per kilowatt-hour is made to the mining and coking departments of the company. With operation and maintenance, including depreciation, amounting to less than 2/5 cent per kilowatt-hour and ⅜ cent for the gas as above noted, there is a handsome percentage of profit to be applied in reducing the capital investment.

The accompanying table gives the results of tests made by Professor Lange of the Technical University at Aix-la-Chapelle of the two 2400 to 2600 bhp. gas engines. Owing to these tests taking place on a Sunday, it was impossible to overload the engines, but preliminary trials had shown an overload capacity of 16 per cent. At the same time the reliable parallel running of the gas engines, combined in every possible manner and under different loads, was well proved.

Results of Tests of Two 2600-hp. Gas Engines

	Test 1	Test 2
Output in kilowatts	1530	1554
Heat consumption guaranteed in B.t.u. per i.h.p. per hour	8000	8000
Tested consumption in B.t.u. per i.h.p. per hour	6865	6862
Total efficiency, taking the efficiency of the dynamo at 0.945	0.794	0.794
Proved efficiency at full load	0.844	0.857

Following these trials Professor Lange tested one of the engines, designed for coke-oven gas, with the special object of ascertaining how it would work when driven by producer gas made from coke. The engine worked at full load without any alteration of the valves or governing gear, either with coke-oven gas of 340 to 450 B.t.u. per cu. ft. or with producer gas of 113 B.t.u. per cu. ft.

The total output stated above represents about twice the amount of power formerly obtainable in steam plants with gas from the same number of coke ovens, and it exceeds largely the local requirements. From the Anna No. 2 shaft a transmission line, which carries the current as generated at three-phase, 42 cycles and 5500 volts, extends to the Edward shaft. A second line, with the potential raised to 35,000 volts by transformers, extends to the Eschweiler shaft, about 11 miles distant, and a third to the Maria workings near at hand. Hoisting is done on the Ilgner system of electric balancing and control, through a motor generator set.

One thing which has thus far discouraged the use of coke-oven gas in this country for gas-engine cylinders has been the apparent difficulty of properly cleansing it. The problem becomes complicated by the necessity of separating both the various tar products which such gas carries in suspension, and the more intimate mixtures of sulphur and cyanogen compounds commonly found in it. The tar products, if not thoroughly removed, are the principal cause of fouling the inlet ports and valves of a gas engine, as well as its cylinder. They also frequently cause premature ignition and sticking of the regulating mechanism. Sulphur compounds turn into sulphurous acid during combustion, are converted into sulphuric acid by contact with the moisture and serve to eat away rapidly the metal of the pistons, rods, packing, exhaust valves, etc. Since it is necessary to use water in cooling and muffling, there is always danger of destroying vital parts of the mechanism if the sulphuretted hydrogen is not prevented from entering.

In European plants inspected by the writer these difficulties were encountered initially, but they have been very practically overcome. The tar products which the gas carries in the form of vapor are thoroughly removed, or may be otherwise separated by an acceleration in the cooling of the gas. Should tests develop that, from any cause, a residue remains, it can be caught and retained in a very simple form of washer. The separation of the sulphur and cyanogen compounds has proved more difficult. Several different methods of purification have been brought out in Germany, among the best of which, in addition to the above, is one used by the Gewerkschaft Minister Achenbach, with mines and oven located at Brambauer, near Dortmund, in Westphalia, Prussia, both the gas-cleaning plant and the engines for which were built by Haniel & Lueg, Dusseldorf. Another will be found at the Heinitz gas engine plant of the Prussian royal mines in the Saarbrücken dis-

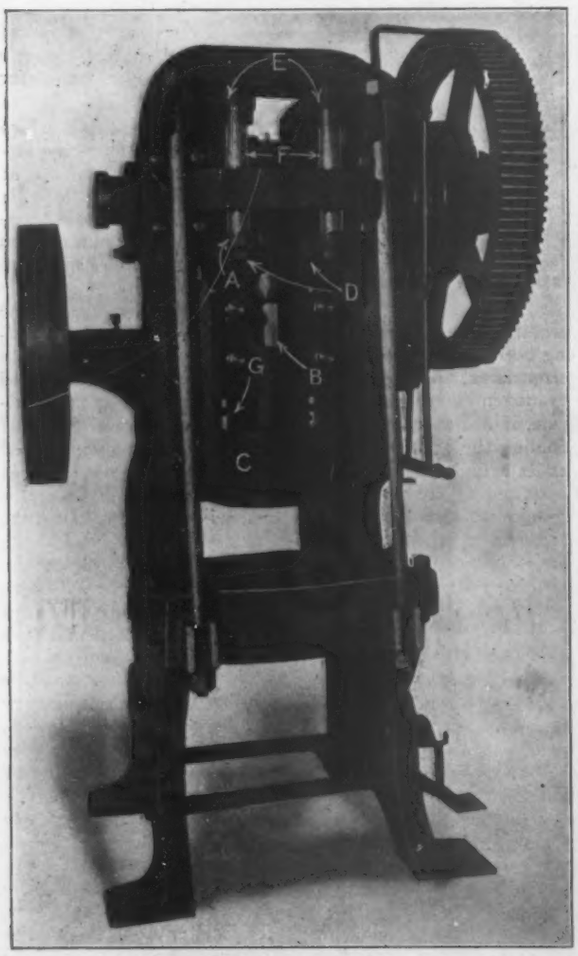
trict, where machines aggregating 11,200 hp, built by Ehrhardt & Sehmer, Saarbrücken, are operated on the gas from Koppers ovens. In all three stations clogging and cutting are conspicuously absent.

At the last named plant the writer obtained an interesting comparison, which he overlooked inquiring about in connection with the Eschweiler plant, viz., as to relative value of the gases obtained from the older types of ovens and those yielded by the new Koppers by-product ovens. At Heinitz the former gave about 3800 cu. ft. per ton of washed coal coked. The latter have been yielding in actual service over 6000 cu. ft., with the same grade of coal. This, of course, is after making allowance for heating the ovens.

New Double-Acting Cam Press

For the deep drawing at a single stroke of light and medium gauge metals and to produce the maximum draw at one stroke that stock of this nature would stand, the Standard Machinery Company, 7 Beverly street, Providence, R. I., has brought out a new double-acting cam press. Although this machine is similar in design to this company's standard line of B power presses which it has built in both plain and geared, and single and double-acting styles, the new machine was especially designed for the drawing and forming of stock with maximum flow and ductility without broaching or breaking, such as mild aluminum, brass or copper.

As will be noticed from the engraving the machine consists of an extra heavy drop forged crankshaft with two steel cams A, forced over the wings and making contact with the upper connection of the inner or drawing ram B. Some idea of the power of the press and the rigidity of the shaft as well as its power can perhaps be gained from the statement that the bore of each cam is 7⅛ in. which is the same diameter as the crankshaft



A New Double-Acting Cam Press for Drawing and Forming Aluminum, Brass and Copper Built by the Standard Machinery Company, Providence, R. I.

wings and the diameter of the wrist pin on the inner or drawing ram has a diameter of 3½ in. The over-all length of the cams is 4⅜ in. and the actual bearing surface is 3 in. The maximum and minimum radius of the cam is 7 1/16 and 4 1/16 in. which gives a throw of 3 in. on the blanking ram C. This throw is said to be exceptionally large and has been made so to permit a piece more than 3 in. high to be produced at a single stroke without employing a raising die. The drawing stroke or that of the inner plunger is 7 in. and the press is so arranged that both the blanking and the drawing ram start on the up stroke at the same time, an arrangement controlled by setting the cams on the crankshaft.

Capped bearings 9 in. long are used on the machine which enable the shaft to be taken out without pulling it through at one end. Steel is employed for the yokes, the two lower ones D being cast, while the upper ones E are forged and are connected by steel pins relieved on the inside for clearing the cams. The lower yoke extends through bronze bushed holes in the blanking ram and controls the adjustment of it by the spanner nuts G, shown in the lower part. The four screws on the blanking ram are set in elliptical holes with bushings bearing against the shanks of the lower yokes. The supporting straps on the back and front of the press are babbitted for the purpose of securing a perfect running surface for the yoke pins. Forged steel is used for the inner plunger which runs up and down in the blanking plunger in a bronze sleeve. This arrangement, it is emphasized, makes the construction of both plungers together with the yoke and cams very simple, renders adjustment easy and insures smooth running.

A single train of cut gears is used for driving the press and the builder's standard instantaneous roller friction clutch is employed for stopping and starting. The bearings of the crankshaft are of solid construction and are provided with bronze bushings. Either balance wheel or loose pulley drive is furnished and if desired the press can be used as an inclinable one.

The following table gives the principal dimensions and specifications of the press:

Stroke of cutting slide, in.	3
Stroke of drawing plunger, in.	7
Adjustment of cutting slide, in.	1½
Adjustment of drawing plunger, in.	2
Face of cams, in.	2½
Diameter of cam rolls, in.	4
Proportion of gearing	5½ to 1
Maximum distance between slide and bolster, in.	10
Size of bottom of slide, in.	14½ x 8
Depth of bolster plate, in.	2
Distance between uprights, in.	19
Depth of bed, in.	19
Width of bed, in.	28¼
Size of hole in bed, in.	16½ x 9
Distance from center of slide to back of press, in.	7
Diameter of flywheel, in.	30
Face width of flywheel, in.	4⅜
Weight of flywheel, lb.	450
Speed of press, r.p.m.	225
Weight of press, lb.	8,500
Over-all height, in.	94
Floor space required, in.	60 x 70

This press can be furnished with either a hand or foot trip as may be desired and with roll or dial feed for the production of special work.

John Hassall, Inc., Clay and Oakland streets, Brooklyn, N. Y., manufacturer of rivets, escutcheon pins and special wire nails, is making an addition to its plant on a plot 75 x 100 ft. recently purchased. The addition will give the company a frontage of 200 ft. on Clay street. Its business has been increasing yearly for the past 10 years, the increase in 1911 having been the largest. The business was established in 1850.

The Crawford Locomotive & Car Company, Streator, Ill., has received an order from the Chicago, Burlington & Quincy Railroad for 500 steel center sill constructions, which will be applied as reinforcers to old equipment by the railroad company at its own shops.

J. W. Wright & Co., dealers in machine tools and accessories, are now located at 1221 to 1223 North Broadway, St. Louis, Mo., where they carry a very complete stock.

The officers and employees of the Anderson Tool Company, Anderson, Ind., to the number of 250, held their annual banquet December 20 in the Masonic Temple.

Plant of the Gardner Machine Company

Economics, Structural Provisions for Shafting and Crane Supports and Unusual Basement Arrangement of a Reinforced Concrete Building at Beloit, Wis.

As an example of what may be worked out for a shop the requirements of which are in the neighborhood of 25,000 sq. ft. of floor space, the plant of the Gardner Machine Company, Beloit, Wis., presents much of interest. The company manufactures well-known types of disk grinders and its plant is designed for a machine shop proposition. The type of building is simple, contributing to a moderate cost of construction. The materials used insure a low maintenance cost. Economies of space are effected and primarily the well-being of the employee is conserved.

In addition to the considerations attaching to the general requirements of a machine shop, the builders had in mind to include the complete plant in one self-contained building of fireproof construction with lighting facilities adequate to promote both the comfort of the employee and a high degree of efficiency. The building was laid out with a floor plan 100 ft. wide by 200 ft. long, and is carried on concrete piers spaced 20 ft. apart along the shop and at varying distances across the shop, depending on the loads to be carried. The ground upon which the building is erected was of such a level that a slight excavation sufficed to allow the reinforced concrete floors being laid on the foundation piers with a 6-ft. air space remaining below it. This concrete floor is about 24 in. above the surrounding ground level, so that in the foundation wall narrow window panels could be inserted for lighting this air space. Not only does this space beneath the machine-shop floor afford room for the storage of a large amount of lumber and general supplies, but allows for carrying heating, water and other piping and electric wiring below the floor. In contrast to the discomforts of the ordinary cold concrete floor laid directly on the ground, the construction described provides by virtue of the heating pipes below a warm and dry floor, which has been found exceedingly satisfactory.

Forty feet from the rear end of the building this sub-floor space is separated by a concrete wall from a basement 9 ft. 6 in. deep. The excavation at this depth extends the entire width of the building. It is divided into two equal sections by a passage into which a sub-track from the yard switch enters the end of the building. In one of these basements the low pressure heating boilers, together with boiler feed, water and air pressure pumps and coal bins, are located. Coal may be unloaded directly from cars on the sub-track to the bins below. Electric current for power purposes is purchased and no provision for making power for the plant is as a result necessary. The opposite basement is used for storage purposes. Both basements have concrete walls and floors, waterproofed inside below the ground surface. This adaptation of the basement space has advantages at once apparent as regards saving in floor space and additional outlying buildings.

For the superstructure, a single monitor-type reinforced

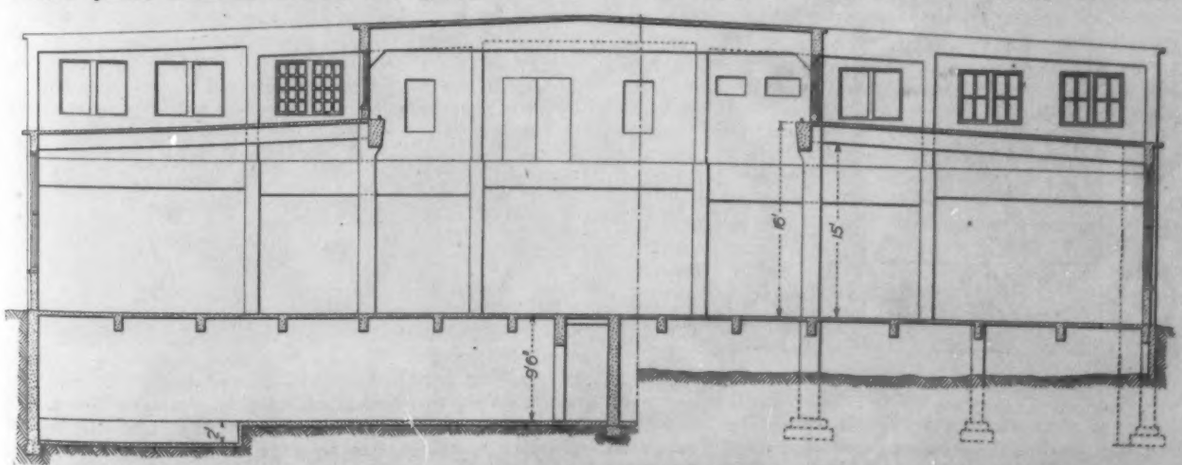


Fig. 1—Cross-section of the Reinforced Concrete Building of Gardner Machine Company Showing Basement Space and Monitor Roof

fireproof construction with a 40-ft. central bay and two 30-ft. side bays was adopted. From the standpoint of ventilation and overhead lighting for a shop of this size and type, the distance from the floor to the underside of the concrete roof beams being 22 ft. 11 in., the monitor design was favored as the most desirable. A cross-section of the building is shown in Fig. 1. The concrete columns are spaced 20 ft., with concrete roof beams in the center bay at 10 ft. intervals, and in the side bays at intervals of 7 ft. The use of concrete construction admits of a much more open overhead space than is possible with a trussed construction. The whitened concrete also provides excellent reflection for the light, and in addition offers no obstruction to the continuous radiation of light. The sides of the monitor are a continuous panel of windows made up of sash 3 ft. 6 in. x 5 ft., while in the side walls the sash are 3 ft. 6 in. x 10 ft. In the monitor lights and the upper three-fourths of the side wall lights ribbed glass is used to shut out the direct rays of the sun, but the lower portion of the side wall windows is clear, the idea being that workmen are more content and feel less shut in than when all possibility of seeing outside of the plant is denied. The arrangement thus provided as regards lighting is found to preclude shadows in any part of the plant.

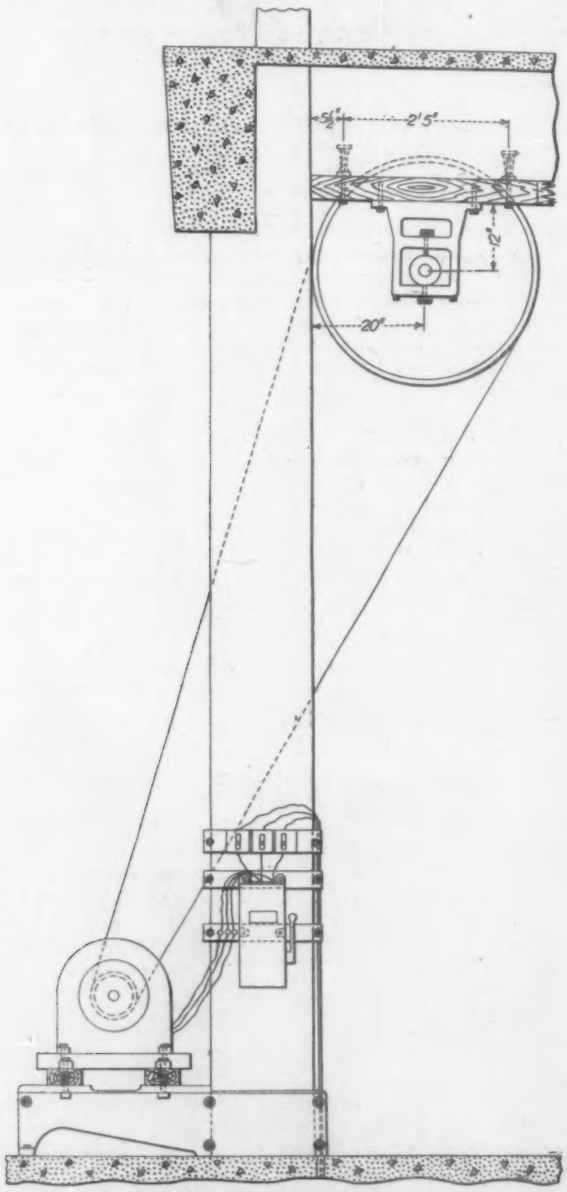


Fig. 2—Details of Support for Motors and Shafting

For a shop working in metals where the fire risk is naturally small it is possible to substitute wood frame sash for metal sash with practically no increase in the insurance premium. This has been done in this instance with a very considerable saving in cost. In general, the cost of the type of building adopted was found to be somewhat less than a fireproof steel frame building and somewhat larger than the cost of an ordinary brick and steel construction. The cost of providing the sub-floor space is estimated as a little more than $500 above the cost of preparing the ground and laying concrete floor directly on it.

The artificial lighting is by means of tungsten clusters. In the main bay these clusters are arranged in parallel rows 25 ft. apart and spaced every 20 ft. along the building, the height above the floor being about 25 ft. In the side

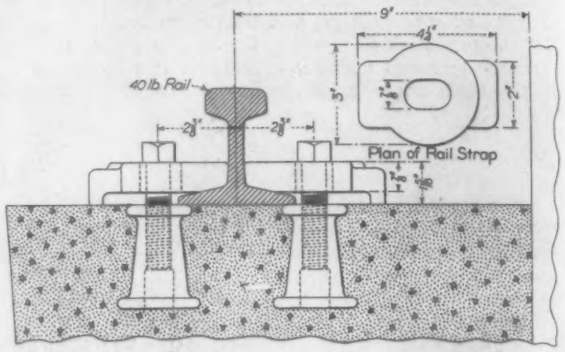


Fig. 3—Method of Supporting the Crane Rails

bays similar clusters are arranged in two rows, 15 ft. apart, with the lights staggered at intervals of 12 ft., the height above the floor being about 14 ft. The heating system is a vacuum, steam coil installation with a part of the coils carried overhead under the monitor windows and a part along the side walls under the windows. Service water for the plant is distributed under pressure from a pneumatic tank located under the floor.

The arrangement of the machine shop floor places the various machines in groups along the row of columns on one side of the center bay. The center bay floor is used for assembling and is traversed by a crane covering its full length, and the other side bay is used for testing the assembled grinders. All of the framing for the transmission equipment, which is arranged for group drive from motors, is hung from the concrete roof beams of the side bays, the line shafts being close to the columns and the countershafts farther back to give proper angle to the belts. This framing consists of I-beams for the stringers and channels for the cross-braces. Threaded sockets were inserted in the forms for the concrete before it was poured and the bolts carrying the framing are screwed into these sockets. The location of the lineshaft was fixed, but in view of the possibility of moving or increasing the countershafts these sockets were inserted in the roof beams at intervals of 4 ft. To take up possible vibration wood block separators are inserted between the I-beams and channels. Hess-Bright ball-bearing hangers are used throughout. The manner of inserting these sockets into the concrete, both for hanging the shafting and also for holding the crane runway rail, are shown in Figs. 2 and 3. Fig. 2 also shows a column bracket upon which the driving motors are carried. The half-tone engraving gives a general view of the interior of the shop.

On the ground floor at the front end a tool room is located on one side of the building and a stockroom on the opposite side, both inclosed with heavy steel screens. On the second floor are general offices, drafting-room and the pattern shop. To add somewhat to the exterior appearance of the building the front end has a stucco finish.

The Matthews-Davis Tool Company, St. Louis, Mo., moved December 15 into its new three-story concrete factory building. A floor space of nearly 16,000 ft. is provided for the exclusive manufacture of the Davis extension boring tools. The machine shop equipment includes five milling machines, four improved engine lathes, two turret lathes, two boring and tapping machines, two automatic spline milling machines for milling slots, five cutter grinding machines, one 10 x 72-in. Norton grinder, five drill presses, one 18-in. shaper, five power saws, and one special broaching machine. The tempering room has been equipped with cyanide gas and coke furnaces.

Coal-Handling Crane

One of the recently completed electric traveling crane installations made by the Northern Engineering Works, Detroit, Mich., was at the mills of the King Paper Company, Kalamazoo, Mich., for handling coal in the boiler room from plans prepared by Daniel J. Albertson of the

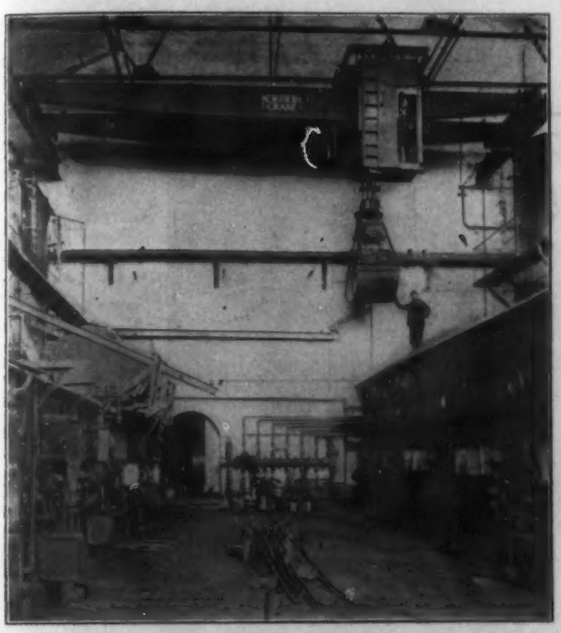


Fig. 1—View in the Interior of the King Paper Company's Boiler Room, Showing the Coal Handling Crane Installed by the Northern Engineering Works, Detroit, Mich.

latter city, who was the consulting engineer and architect for the entire plant. Interior and exterior views of the boiler room are given in Figs. 1 and 2 respectively.

The construction of the crane which is brought out in Fig. 1 embodies a somewhat novel principle as the operator's cab is attached directly to the crane trolley, that is

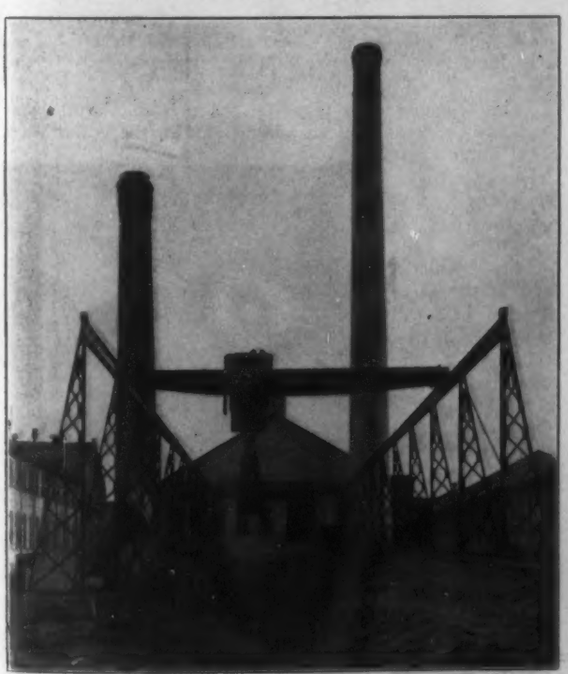


Fig. 2—The Exterior of the Plant Showing the Hole Left in the End Wall for the Passage of the Crane

located on the side of the crane so that the amount of effective travel of the trolley is not reduced. Three motors are used on the crane and the hoist is provided with a dynamic brake and also an extra large and powerful solenoid brake having an automatic circuit breaker and limit stops, wear compensating device, etc. Steel is employed for all the gears and bearings are bronze bushed throughout. An automatic weighing device recording the weight of the load forms a part of the crane's equipment and it is so arranged that it can be released at the option of the operator and the crane operated without using the device. As the crane is used part of the time indoors and part out, the trolley is covered and the cab inclosed to protect the operator.

Coal is delivered in cars on an elevated siding outside of the boiler room and is lifted from the cars and conveyed a short distance to the coal pile alongside the track where it is stored for future consumption. If desired coal can also be taken directly from the cars and conveyed through the end of the building into the boiler room, an opening which is shown in Fig. 2 having been left in the wall to permit the passage of the crane and its load. Special doors close this opening so that the room can be inclosed in cold weather.

The elevated runway extends for a distance of 350 ft. outside of the boiler room and 72 ft. inside. The coal is taken from the yard or from the car as the case may be and is conveyed directly into the boiler room and dumped into hoppers over each boiler as shown in Fig. 1. From this point the fuel is fed into the boiler by a Detroit automatic stoker, an illustrated description of which appeared in *The Iron Age* February 9, 1911.

The span of the traveling crane is 42 ft. and the lift is 50 ft. Direct current is employed to operate the three motors. The hoisting speed of the crane is approximately 75 ft. and the bridge travel 350 ft. per minute and the capacity of the grab bucket, which is of the Williams type, is 1½ cu. yd.

American Association for Labor Legislation

Workmen's compensation, the unemployment problem in America, and safety and health in the mining industry are subjects which are to be given special attention by the fifth annual meeting of the American Association for Labor Legislation, Washington, D. C., December 28, 29 and 30, at the New Raleigh Hotel. Among those on the programme to discuss compensation and insurance legislation, on the evening of December 28, are John H. Wallace, Washington State Industrial Insurance Commission; C. H. Crownhart, Wisconsin Industrial Commission; James A. Lowell, Massachusetts Commission on Compensation; Thomas J. Duffey, Ohio Board of Liability Awards; W. C. Brown, Federal Workmen's Compensation Commission and president New York Central Railroad. On the morning of December 29 there is to be taken up the subject of the uniform reporting of industrial injuries; on the afternoon of the same day the unemployment problem in America, and on the morning of December 30 the subject of safety and health in the mining industry.

Follansbee Electrical Steel Sheets

The Follansbee Brothers Company, Pittsburgh, Pa., manufacturer of Scott's extra coated roofing tin, bright tin plate and steel sheets, is now producing electrical steel sheets of high quality, for use in making motors, transformers, etc. The works of this company are located at Follansbee, W. Va., in the Pittsburgh district, and include an open-hearth steel plant, improved motor-driven sheet mills and complete chemical, metallurgical and electrical laboratories. The Follansbee electrical sheets are made from the company's own best quality open-hearth steel. As a means of improving the permeability, the steel ingots are reduced under an 8-ton hammer instead of being rolled into billets, which is the usual custom. Two grades of electrical sheets are produced, one known as Follansbee improved electrical steel sheets and the other as Follansbee transformer sheets, the latter being rolled from high silicon steel. The company will furnish samples in quantities sufficient for making tests free of all carrying charges.

The Reading Iron Company will build three Roberts three-pass fire brick stoves at its Crumwold furnace at Emaus, Pa. Frank C. Roberts & Co., Philadelphia, are the engineers.

A Factory Fire Fighting System

Automatic Sprinklers and an Efficient Fire Department Important Factors at the Norton Companies' Plants

To reduce as far as possible, if not entirely eliminate, interruptions to the regular factory routine due to damage by fire the Norton Company and the Norton Grinding Company, Worcester, Mass., have organized factory fire departments. These bodies have been equipped and trained to such a state of perfection that they compare favorably with the corresponding municipal organizations. A description of the work done along these lines appeared in a recent number of Grits and Grinds, the companies' house organ, from which the subjoined information has been taken. In addition to the fire departments with their apparatus, the fire protection arrangements include automatic sprinklers, a special high-pressure water supply system and a number of conveniently located alarm boxes. Fig. 1 shows the hand-drawn hose reel which is kept ready for service at all hours, Fig. 2 illustrates one of the auxiliary stations which are scattered throughout the plants of both companies, and Fig. 3 is a view of one of the hose racks that are conspicuously located in convenient places. A view of the fire department in action is given in Fig. 4.

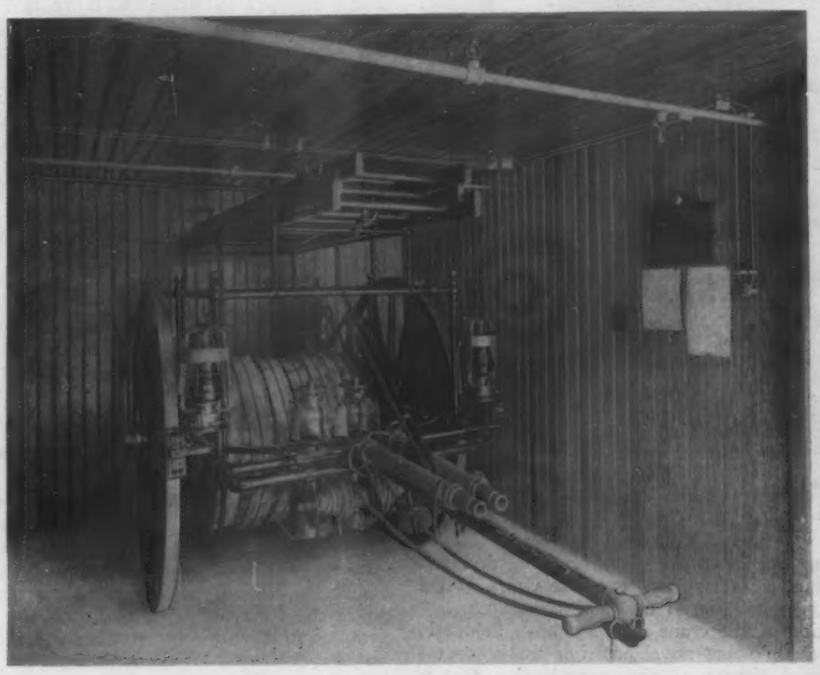


Fig. 1—The Hose Reel Used by the Fire Department of the Norton Company, Worcester, Mass.

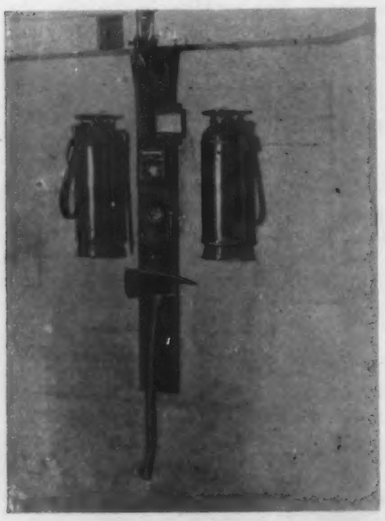


Fig. 2—One of the Auxiliary Stations

The Norton fire department is composed entirely of picked men, all of whom live near the works, and who are ready to jump to the call of duty night or day, Sundays and holidays. These men have been trained to quick work. Frequent tests have shown they are not only able to lay lines of hose into buildings with all the speed of trained firemen, but that the chemical corps is efficient in having enough chemical extinguishers on hand within a few seconds of an alarm to drown any ordinary fire.

Fire Fighting Equipment

The fire department equipment consists of one hand-drawn hose reel, shown in Fig. 1, equipped with 600 ft. of 2½-in. water hose, a 25-ft. ladder, and a full quota of lanterns which are kept lighted at night, the same as on city fire departments, and ready for immediate service. There are also many 3-gal. hand chemical extinguishers, which contain more of the fire squelching gases than the tanks of horse-drawn chemical fire engines.

All through the works, auxiliary boxes to the city fire alarm have been installed. In addition there are eight stations for the Norton Company private alarm, and the Norton Grinding Company has three of these stations. The breaking of a small glass is sufficient to sound the private alarm, but the auxiliaries to the city alarm must be pulled in the same manner as the street boxes. Every alarm station on the Norton private system has been made a clustering place for fire-fighting tools, as is clearly brought out in Fig. 2. Close beside each station are two hand chemical extinguishers, an axe and the other things that may come in handy to the one who discovers a fire and sounds an alarm. The man discovering a fire may first break the glass with a small tapper suspended from a leash, then with his call for assistance registered, he may arm himself with an axe and chemicals without further delay.

The breaking of a glass on the private alarm system registers the box upon an annunciator in the boiler room. The number of blasts corresponding to that of the box is blown on the works whistle, and at the same time a bell call is sent to nearby stations of the city fire department, but a short distance from the main entrance to the works. Should a fire prove to have too great a headway for the Norton firemen and those of the nearby fire stations, a city alarm may be registered by pulling any auxiliary box, and assistance called while the firemen already on the scene are fighting the blaze. In cases where water or chemicals are poured into buildings, a salvage corps has been provided to

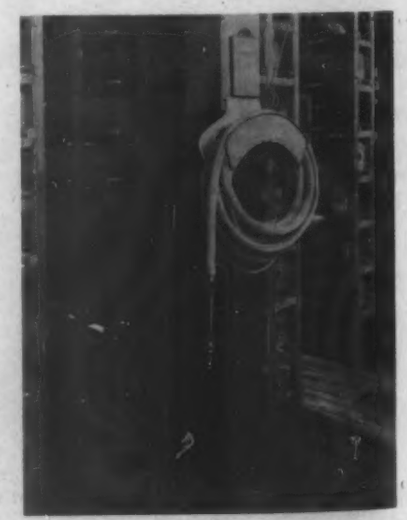


Fig. 3—Hose Racks with 2-In. Hose and Nozzle Scattered Throughout the Plant Form a Portion of the Department's Equipment

work at cleaning up and salvaging goods, that water may not be permitted to do more damage than fire. The salvage corps has been trained to save stock, order blanks, book folders and every little thing of value aside from cleaning out the water immediately after a fire, that it may not leak down on the stock and materials on floors beneath.

The fire department has good water pressure to work with. The high-pressure four-way hydrants, distributed liberally about the yards of the Norton works, have a tested pressure of from 120 to 130 lb., a pressure that would do credit to a small steam fire engine. Sketches have been made of the location of every hydrant, water cock and standpipe, and the Norton firemen have studied them diligently, until they are familiar with every station. In recent tests they have pulled their hose wagon from its station, hustled it to the nearest hydrant to the box from which the alarm registered, made connections, and had a water line laid into the building supposed to be burning, in 1½ min., then returned to the hydrant and laid a second line in 3¼ min. from the first stroke of the alarm. Taking into consideration that part of the haul of the hose-cart was over a railroad trestle, where the city fire department wagons could not go at all, the private firemen's work was satisfactory, and probably beat out the city department, starting from its house on the alarm, by from 8 to 10 min.

Auxiliary Equipment

In addition to the general automatic sprinkler service, the works are equipped with standpipes, to which 2-in. hose is attached, with the nozzle all ready for the inside hose crew. These standpipes are attached to high-pressure water service. The power house has additional protection from fire which might be caused by sparks, inasmuch as its roof is piped in a way that makes it possible to flood it with water instantly in case of fire.

Fig. 4—The Fire Department Going Into Action

The roster of the Norton Fire Department is: chief, deputy-chief, first and second assistant chiefs, the outside hose corps, which is composed of a captain, two lieutenants and 16 men; the inside hose and salvage corps, composed of two captains, one for water hose squad and one for the hand chemical and salvage corps, and a lieutenant for each. The inside hose corps has, aside from its officers, seven men, while the hand chemical and salvage corps has nine, exclusive of the officers.

Service Records

On a recent morning, in the midst of the hardest thunder and lightning storm of the year, a watchman discovered smoke in the kiln department, investigated, found a fire and sent in an alarm. The watchmen have been instructed to pull an alarm first, then go back and fight until assistance arrives. Although it was some time before daylight, and workmen not due at the works for 2 hr. or more, a captain and 10 men braved the rain, thunder and lightning to respond to the shop whistle on a fire call. The city apparatus, called on thermostat alarm, went astray, not being familiar with the shop geography. But the Norton firemen plunged into the thick of it, nipped the fire in its incipiency, and the men of the salvage corps were getting in their work by the time the city fire department came clanging up to the scene.

The good work of the Norton firemen, the interest and loyalty shown by leaving beds and braving a rain at 5 o'clock in the morning to light fire was taken up by the directors the following day, and it was decided to pay each Norton fireman responding to all alarms outside of working hours for his trouble. At a recent alarm on a Sunday afternoon, 23 Norton Company firemen responded, and 11 firemen from the 18 men comprising the department of the Norton Grinding Company.

The hose reel has been placed in a fire station especially fitted up for it, at the south end of Plant 3, a central location, and an annunciator box has been installed so that firemen who could not catch the box from the whistle may find it shown upon the wall by the time they arrive for the apparatus.

The Blake Specialty Company

The Blake Specialty Company, Rock Island, Ill., furnishes an example of an important manufacturing establishment quickly developing from a small beginning. J. D. Blake, vice-president of this company, was formerly of the local plumbing firm of Blake & Murphy. While in that business he perfected a clean-out contrivance to be used on all clean-out fittings in house drains and the company was organized in 1909 to manufacture this device. The products now include other patented articles, which are specialties with this company, comprising floor drains, running-back water traps, test tees, test plugs, drum traps, fittings, bends, brass and iron ferrules, crosses, spigots, house boiler fittings, curb boxes, etc.

Among the products manufactured is an improved earth auger for use in drilling a hole for a pipe leading from a house connection to the main in the street, enabling a plumber to make the connection without digging the usual trench for the whole distance. This auger is fitted with a hose, the water passing through which aids in the boring.

The company has just completed a large plant in the new industrial division in the west end of the city of Rock Island. The tract on which it is situated was donated by the Rock Island Industrial Commission. The tract comprises four and a quarter acres on which six buildings have been erected, comprising a foundry, 80 x 100 ft.; cupola room, 20 x 30 ft.; core room, 20 x 30 ft.; mill room, 30 x 45 ft.; machine shop, 60 x 75 ft., and heating and pumping plant, 25 x 40 ft. Individual motors are attached to each machine and everything has been done to make the plant agreeable for the workmen. The company will shortly install brass furnaces to make its own brass castings and a galvanizing plant for the purpose of galvanizing its own fittings.

J. T. Shields is president of the company and M. C. Shields is secretary and treasurer. J. J. Croft, for several years assistant superintendent of the Red Jacket Mfg. Company, Davenport, Iowa, will have the supervision of the plant. The company's devices have been adopted in not only many cities in the United States but also in the Dominion of Canada and in the Philippine Islands. A branch house is located in New York City, which will be used as a warehouse and distributing station, while plans are being considered to establish a distributing point in New Orleans.

The Thomas Furnace Company, Milwaukee, Wis., put its furnace in blast November 20. It had been out since July, 1910. Meantime the old hot blast stoves had been torn down and two J. E. Thomas patent fire brick stoves, 18 x 80 ft., erected in their places.

Wire Flattening Mill

A New German Machine for Producing Flat Strips from Round Wire

For producing flat strips from round wire without having to anneal it between the different passes, August Schmitz, Walzmaschinenfabrik, Düsseldorf, Germany, has placed on the market two types of wire rolling or reducing mill. One of these mills, which is designated as the type

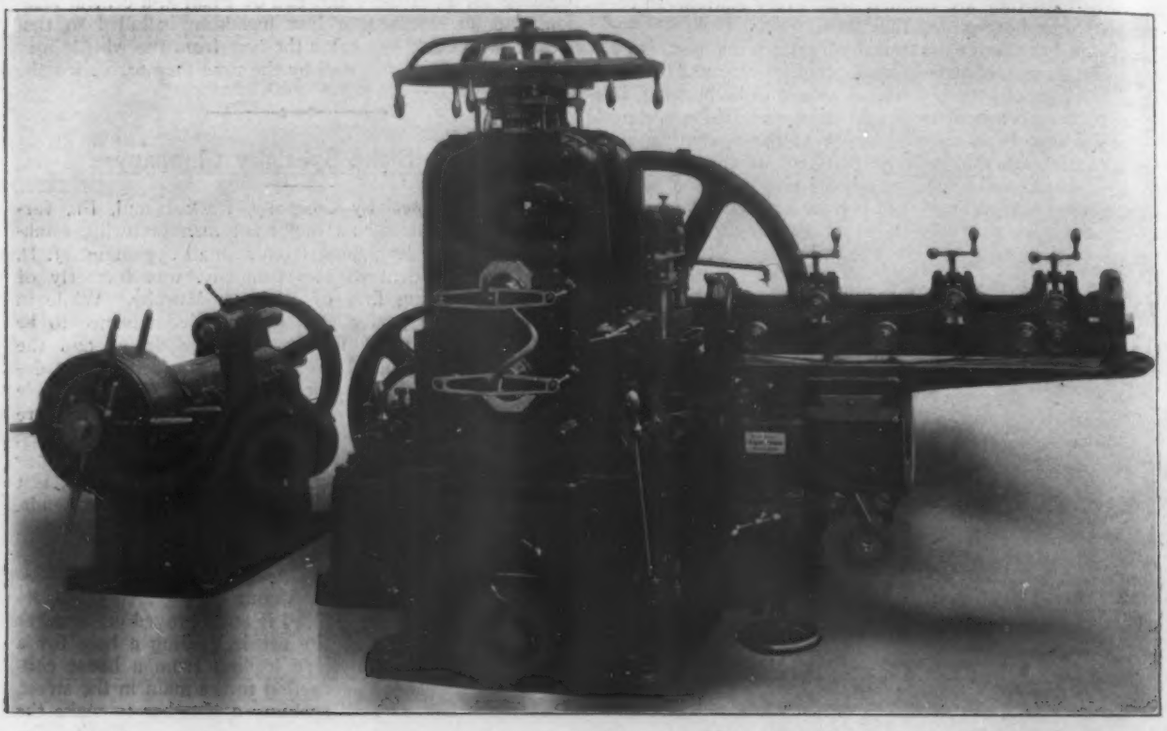


Fig. 1—A New Type of Wire Flattening Mill Built by August Schmitz, Walzmaschinenfabrik, Düsseldorf, Germany

A, will take wire 0.314 in. in diameter and reduce it to a flat strip 0.019 in. thick, or thinner if required, while the other, the type A 1, will take wire having a diameter of 0.472 in. and reduce it to flat strips as thin as 0.039 in. or less. Fig. 1 shows the mill with the straightening device in position, and Fig. 4 illustrates it with the edger attached. The discharge side of the machine with the finished product wound on the coiler and bound is shown in Fig. 5, while Fig. 2 is a view of the coiler with the gear box open. Fig. 3 illustrates the output of the two types of mills as it appears after the different passes have been made.

The rolls which do the reducing can be had in two

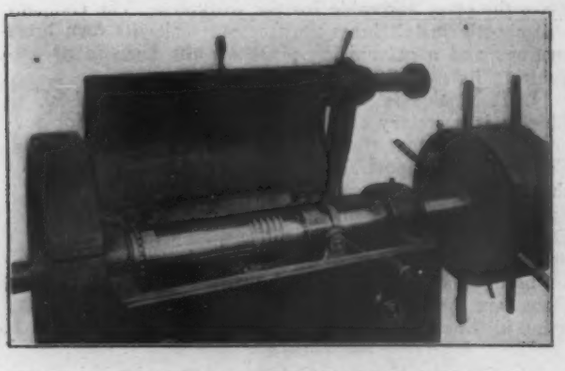


Fig. 2—The Coiler Gear Box with the Cover Removed

sizes, one measuring 8 in. in diameter and 5 in. across the face, while the other is 2 in. larger in diameter and 2 in. wider. These are made of blocks of steel with the surface hardened and ground to the right size and polished. To distribute the pressure evenly the necks of the rolls have a large bearing surface. Provision is made for internal water cooling and the rolls run in bearings lined with anti-friction metal. Cast steel is used for the housings and there are springs between the rolls for raising the upper roll, while in addition the necks are protected against dust and dirt by detachable covers. The upper roll bearing is held in position by brackets from the outside of the housings and the rolls can be changed in a comparatively short time by loosening the two bolts and releasing the bracket, after which the bearing and rolls can be slipped out easily. The housings are kept in position by cotters to prevent vibration and side shifting. The rolls are adjusted by a central adjusting device consisting of a large hand wheel fitted on a spindle with a spur pinion which engages two large diameter gears fitted on the two pressure spindles; in this way heavy pressure can be secured without much

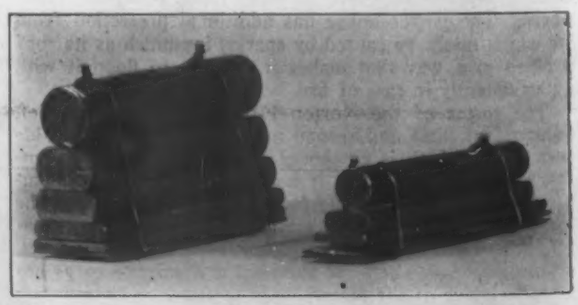


Fig. 3—Successive Stages in Flattening the Wire in Both Types of Machine

exertion. To accommodate the mill to inaccuracies in the strip either of these spindles can be set independently by lifting the gear wheel out of mesh by a special disengaging lever. After the adjustment has been made the spur as to form a pan and the cover on top of them is re-gears can be re-engaged. Tool steel is employed for the adjusting spindles to avoid wear.

The rolls are driven by pinions and safety pins. The housings containing the pinions are shaped in such a way movable to give easy access to the pinions which run in oil. The pinions have staggered teeth to avoid marks on

the finished material, and the pinion bearings are fitted with bronze bushings. The driving mechanism consists of a tight and loose pulley for the smaller mill and a single pulley and friction coil clutch in the larger one.

The equipment of the mill includes feeding and delivery guides, an oil basin, oil pump and complete piping system which enables a thick film of oil to be pumped on the material being rolled as it passes into the rolls. A combined straightening and edging device is mounted turret-fashion in front of the machine so that either part can be placed instantly in the working position by a simple turn of the lever. Fig. 1 shows the mill with the straightening device in working position, while Fig. 4 shows the edger in use. In operation the round wire passes through a tubular intake and then passes through the different straightening pulleys which are adjusted by turning the corresponding levers. The edger is especially adapted for turning the edges of the material to produce half round, oval or flat sections according to the requirements of each particular case. Three different grooves can be turned in the rolls of the edger to give the various finishes.

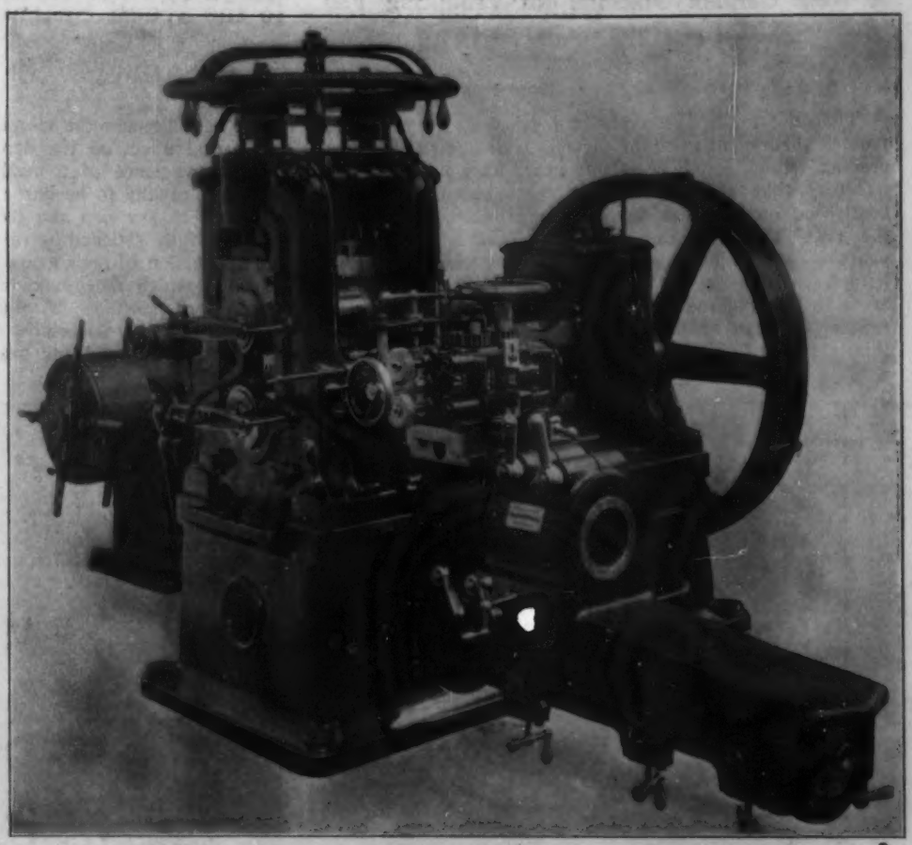


Fig. 4.—The Machine Equipped with a Device for Rounding the Edges of the Finished Product.

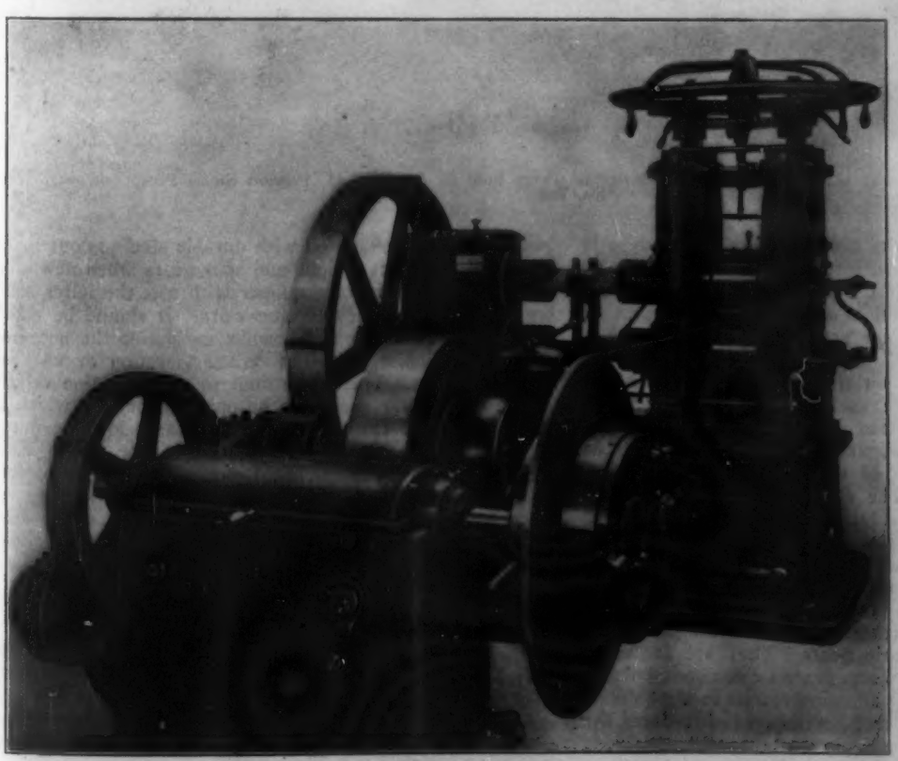


Fig. 5—A View of the Discharge Side Showing the Strip Coiled and Bound

The coiler which is shown in position in Fig. 5, and with the gear-box removed in Fig. 2, is an important feature. It is self-contained, and is driven by a belt from the mill. A special type of friction pulley which compensates for variations in the diameter of the strip and prevents any sliding of the belt and a single worm and worm wheel are used. These coiling wheels are of large dimensions so that the thickest wire can be coiled easily. The winding drum possesses sufficient width and strength and can be compressed when the coiled wire is to be taken off. The coiler is provided with a mechanism that automatically imparts a reciprocating motion to the winding drum. This mechanism can be thrown in and out of gear while the machine is running by the operation of a lever. The width of the coiler is adjustable for various widths of strips. As will be noticed from Fig. 2, the shaft bearings and the driving mechanism of the reciprocating motion are of ample proportions.

The capacities of the two machines are wire ¾ in. in diameter and smaller for the type A, while the maximum diameter of the wire handled by the type A 1 is ½ in. Typical examples of strips produced by these two types of machines are shown in Fig. 3.

The strike of the puddlers at the plant of the A. M. Byers Company, Girard, Ohio, has been settled, the men returning to work on Monday, December 18.

Herringbone Gears*

With Special Reference to the Wuest System

BY PERCY C. DAY†

That the helical principle in toothed gearing is ideal from a theoretical point of view is well known. From a practical standpoint herringbone gears have been less satisfactory than straight-cut spur gears because, until recently, no method was devised for producing them with the requisite speed and accuracy. Within the last six years a method has been found and developed, in England, to a high degree of perfection. Herringbone gears made by this method are called Wuest gears, after the inventor, and can be produced with even greater accuracy than cut gears of the spur type. The distinction between these gears and those of the ordinary herringbone type is that the teeth of the former, instead of joining at a common apex at the center of the face, are stepped half the pitch apart and do not meet at all. This arrangement of the teeth does not affect the action of the gears, but it facilitates their commercial production and admits the use of precision methods in their manufacture.

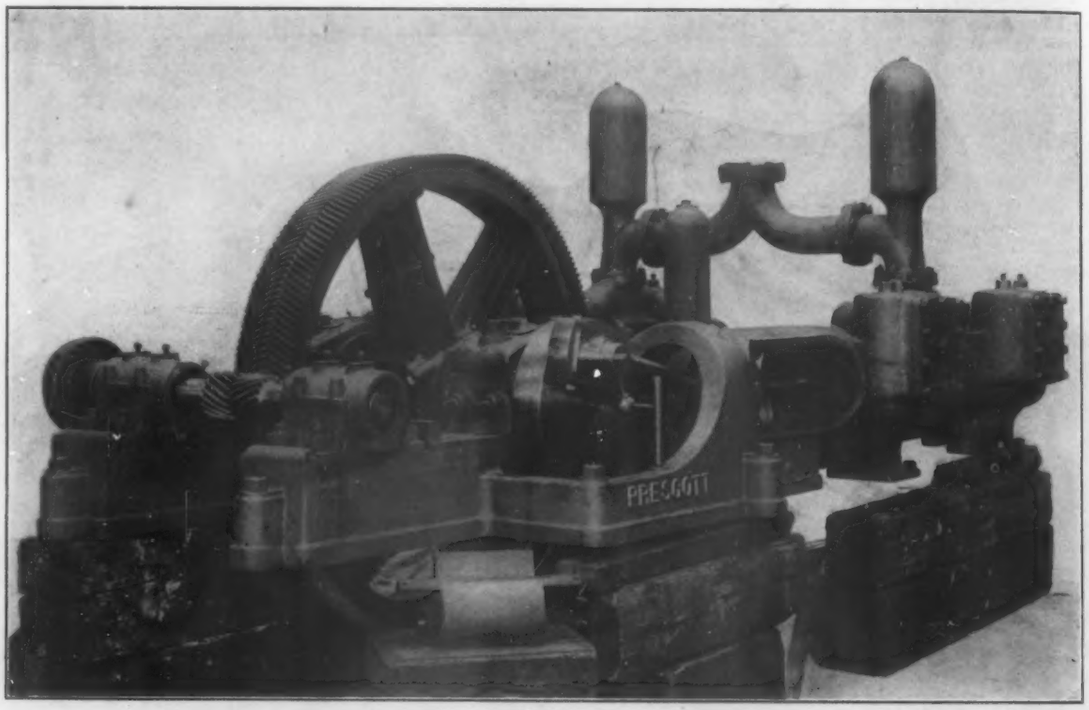


Fig. 1—A Gear Having a Ratio of 12¼ to 1 Applied to a Horizontal Pump Built by the Fred M. Prescott Steam Pump Company, West Allis, Wis.

Before describing some special applications of these gears to the needs of various industries and machines, it may be of service to summarize the salient features of the gears and the changes of viewpoint which these features have engendered. The smooth and continuous action is virtually independent of the diameter or number of teeth in the pinion. Extremely high ratios of reduction can be used without fear of uneven driving or undue wear and without need for unwieldy gear diameters which would be disproportionate to the general design. High ratio gears of this type transmit power with practically no more loss than low ratio gears. They are far more efficient than belts, ropes, worm-gears or compound trains of spur gearing, while their adoption results in a wholesale reduction of countershafts and bearings which reduces the power consumption and running costs to a remarkable degree. There are many instances where spur gears cannot be used because the vibration which they set up has a detrimental effect on the driven machine or its product. The inconvenience of a cumbersome system of belts or ropes has usually to be borne in such cases, but it is not too much to say that the requirements of almost all of them are fully satisfied by this type of herringbone gears. The application of spur gears has been much restricted by the noise which they make when run at high velocities. The use of rawhide or other soft materials has only proved moderately successful for comparatively light work and is quite unsound for heavy gear practice. Herringbone gears in combination with durable steel pinions make less noise than soft pinions and spur gears when new, and while the former become quieter with use, the latter soon begin to rattle as they become worn. It should be noted that the use of soft pinions, while mitigating the nuisance of excessive noise, does not reduce vibration or unevenness of motion. There is a limit to the pitch-line velocities at which spur gears can be operated beyond which it is unsafe to use them. This limit is far below the minimum velocities which can be used in connection with steam turbines of economical design and high power. Accurate herringbone gears operate quite smoothly at velocities which are impossible for other types. This feature would appear to reserve for them a field of application which has great possibilities and is likely to cause some great changes in the standard practice of today.

Applications of the Gears

Direct-connected steam turbines for marine propulsion have been only partially successful in a very limited field. It is only when the power required is very great and the speed of the vessel unusually high that the direct-connected turbine can be applied, and even then the application does not do full justice to either turbine or propeller, while the first cost is much higher than it need be. The use of direct-coupled turbines is confined to ocean fliers and ships of war. Ordinary vessels of commerce, which

*From a paper presented at the annual meeting of the American Society of Mechanical Engineers, New York, December 5-8, 1911.
†Engineer with the Falk Company, Milwaukee, Wis.

are built in vastly greater numbers, cannot be adapted to turbine power in this form.

Mr. Parsons has made a successful introduction of herringbone gears in combination with a steam turbine for driving a continous plate mill. The mill is of the three-high type with rolls 28 in. by 84 in. running at 70 r.p.m. The turbine is designed for mixed pressure, running at 2000 r.p.m. with exhaust steam at 16 lb. absolute or live steam at 60 lb. absolute and giving 750 b.h.p. The turbine is coupled to the rolls through a double train of herringbone gears. The first train consists of a chrome nickel steel pinion, cut solid on its shaft and cast-steel gear. Pinion and gear have 25 and 131 teeth, 3½ diametral pitch by 24-in. face. This train reduces from 2000 to 375 r.p.m. and is coupled to the second train through a flexible coupling. The second train includes a high carbon steel pinion of 23 teeth and cast steel gear of 127 teeth, 2-in. circular pitch by 16-in. face. This train reduces from 375 to 70 r.p.m. The final gear is overhung on the end of a flywheel shaft 22 in. in diameter, which carries a flywheel of about 100 tons between two bearings and is coupled to the main pinion through a pair of wobblers. Both sets of gearing are inclosed in casings and are lubricated by oil jets from a pump provided for the purpose. This mill has been running without a hitch of any kind since September 15, 1910. The gears are noiseless, the installation shows remarkable efficiency, the rolls run with extreme smoothness and the pinions do not show appreciable wear.

Geared turbines have another field of application for driving centrifugal pumps. Direct driven units of this kind have poor efficiency because a compromise has to be made between turbine and pump speed which is detrimental to both. The interposition of a set of herringbone gears allows both ends to be constructed for the highest economy, and since the loss in the gears does not exceed 2 or 3 per cent. there is a large all-round gain in efficiency. This applies also to turbine-driven blowers and fans.

The speed of hydraulic turbines in controlled by the available head of water supplied to them. The greater number of turbines are required to operate under low heads and must run at slow speed. Hydroelectric power has usually to be transmitted to a considerable distance and is produced in the form of alternating current of definite periodicity. The speed of the turbines may be as low as 50 r.p.m. or even less. A large direct-coupled alternator for this speed is an expensive proposition. Herringbone gears can be used to speed up from the slow-running turbines to generators of normal design, speed and efficiency. The smooth action of these gears is unimpaired when the wheel drives the pinion, and high ratios of speed increase can be obtained from them without noise and with less loss than direct coupled units will give.

The field for accurate herringbone gears in connection

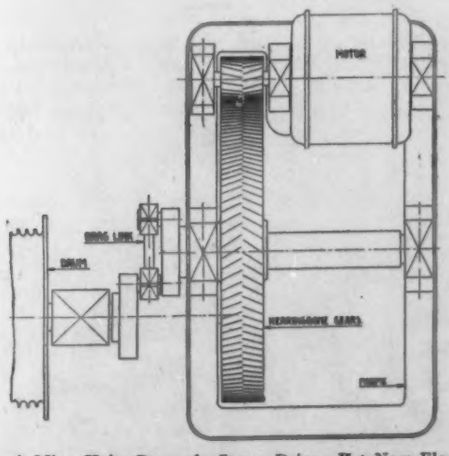


Fig. 2—A Mine Hoist Formerly Steam Driven But Now Electrically Operated Through Herringbone Gears

with machine tool driving is too extended to be considered in detail. For individual motor drives this gear gives a positive transmission which is free from vibration and less noisy than so-called silent chains or rawhide pinions, while there is no trouble from slipping belts or slack chains. But the real advantage of these gears lies in the better finish that can be obtained when they are used for the entire main transmission, and in the higher output combined with reduced maintenance which they give to heavy machine tools. Chatter is eliminated. Even the speeding

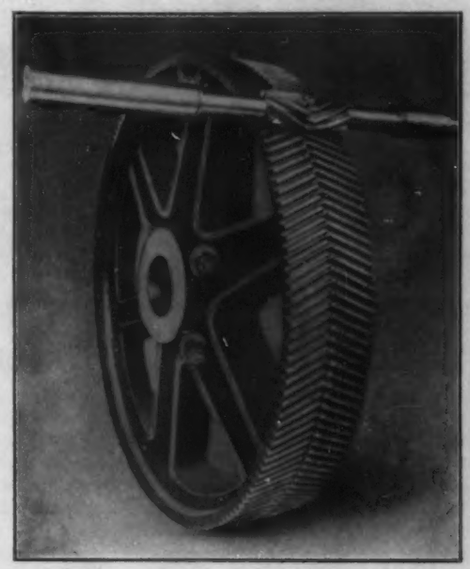


Fig. 3—A Special High Ratio Gear and Pinion, the Latter with Eight Teeth

up to the wheels of grinding machines has been successfully accomplished. Reversing gears for heavy planers are a revelation to those familiar only with the ordinary spur drive.

Electrically-driven plunger pumps have not enjoyed the popularity that might be expected, due to the noise and vibration caused by the gearing between motor and pump shaft. These objections are obviated by accurately cut herringbone gears, which not only give silent and vibrationless transmission but admit the use of high ratio single reductions with compact dimensions. The single reduction drive has a much higher efficiency than the ordinary double frame, quite apart from the lower gear losses, because at least one countershaft can be dispensed with. An example of such a drive is shown in Fig. 1. Similar drives are successful for air compressors and vacuum pumps which present similar difficulties to those met with in plunger pumps.

One of the features in the recent electrifications of the Eckstein group of mines on the South African Rand is a train of herringbone gears between motor and drum in the main hoists. These hoists are driven by reversing asynchronous motors; the geared countershafts being connected to the drums by drag links from the original crank pins that were used when the hoists were run by steam power. The arrangement is shown in diagram in Fig. 2. In installations of this type there are no slipping clutches, and the strains on the gears are very severe, some of them having to transmit 3000 to 4000 hp. at pitch-line velocities ranging from 2000 to 3500 ft. per minute. The large coal mines in Northumberland, Yorkshire and South Wales are rapidly adopting high tension three-phase current for the distribution of power below ground. Some very large main and tail, and endless, haulages are used in these and herringbone gears have become a standard for this class of work. The hoists range from 30 up to 1000 hp. and invariably use a high reduction with ratios which are sometimes as high as 15 to 1. Simplification of design and saving of space is obtained in this way, since ordinary spurs require a double train. The gain in efficiency and absence of noise are remarkable, while the first cost of the whole outfit is often less than when cheaper gears are used. The elimination of all vibration prevents crystallization of the shafts and disintegration of the insulating material in the motors. These gears offer the same advantages for endless haulages. A higher speed motor can be used when they are adopted, while no more than two trains of gears are required. An application of especial interest is for driving tipplers. These gears for this purpose have re-

placed worm gears because they stand up to the heavy strains without excessive wear. The available space for the gears is always limited in such cases. The gears have a ratio of 7 to 1 with a seven-toothed pinion and a gear of only 20 in. diameter. A typical high ratio gear is shown in Fig. 3.

The M. Rumely Company's Expansion

The M. Rumely Company, La Porte, Ind., has issued a statement giving some of the considerations that led to its acquisition of the assets and business of Gaar, Scott & Co., Richmond, Ind., and the Advance Thresher Company, Battle Breek, Mich. It is the purpose of the M. Rumely Company, by means of its larger organization and greater financial resources, to standardize its product and manufacture in larger quantities, specializing each factory to the work for which it is best adapted. In this way manufacturing costs can be reduced.

By an increase in the line of products dealt in, the sales season can be extended over more months in the year, and the sales force kept more evenly employed. Branch houses and storage facilities as well can be centralized, the size of territories reduced, traveling men brought closer together on smaller blocks, avoiding the cost and loss of time of long-distance travel, and the general sales expense, which is the most serious factor in American implement businesses to-day, can be very much reduced.

The M. Rumely Company in its new shape will be in position to enter the export markets, for which its goods are well adapted. England and Germany are at the present time taking advantage of the lack of competitive power of the scattered American threshing machine manufacturers, and are securing a stronger foothold in export fields, especially Argentina and Russia.

The company's present facilities for building steam engines are inadequate for its increasing trade. Its business in hullers is necessarily curtailed for want of manufacturing capacity. Additional shop room, equipment and storehouses seem to be imperative.

In addition to its established line, the company controls in this country the patents for the Lentz poppet-valve engine which has been successfully developed and commercialized in Germany by the Lentz Company, Mannheim, and the Wolff Company, Magdeburg. This engine, with 1½ lb. of coal, will furnish a horse power hour, thus being remarkably economical. But special facilities will be required to manufacture this engine profitably. It could be standardized to two or three sizes, and a large number of each profitably produced and marketed.

In the early days, when Meinard Rumely began manufacturing farm machinery, means of transportation were limited. Farmers requiring such machinery came in by wagon, afoot, by stage and over the short stretches of the first railroads then in use with ready cash to purchase at his shop and haul the goods away. Later he appointed local agents in various parts of Indiana and neighboring States, who at first purchased the machinery outright for cash and resold it Still later they obtained it on consignment and received a commission on its sale.

As the trade expanded over a larger portion of the United States, branch houses were established at jobbing centers like Chicago, St. Louis, Kansas City, Indianapolis, Minneapolis and various other points. In addition to their contract with local implement dealers, these branches maintained at first a few and then an increasing number of traveling salesmen, who assisted the local agents in making sales. These traveling salesmen specialized on one kind of product and were more effective, though more expensive, than the local agents. It gradually became necessary for farm machinery manufacturers to have their traveling salesmen on the ground to assist the local agent, who, unaided, could not successfully compete with the salesmen of competing concerns. The result is that the local agent lost his prime importance as a factor in business, and became merely a spotter who informed the threshing machine company of a prospective customer, leaving it to the traveling salesmen of his company to close the deal. This condition prevails at present, not only in the larger implement business, but to some extent also in the smaller implements, such as binders, mowers, gasoline engines, etc.

The result to-day is that branch houses, traveling salesmen, commissions to local representatives and advertising cost almost as much as it costs to build the machinery from raw materials into a finished product. This waste is largely due to the fact that threshing or plowing machinery is a season product, salable principally for only two or three months of each year. The sales organization must be kept throughout the entire year, which results in long periods of limited activity.

In order to withstand the competition of larger manufacturers of farm machinery who have something for their salesmen to sell at all seasons of the year in every section of the country, on account of their immensely varied lines, it has been found necessary for the M. Rumely Company to secure a broader line of products so that its sales organization may have something that is in season and salable at every period of the year.

In seeking to round out its business the company finds that it should add further products, such as corn shredders, corn huskers, ensilage cutters, road graders, sawmills, rice separators, etc., all of which require power and go advantageously with its traction engine line. An exceptional opportunity exists in the stationary kerosene engines between 2½ and 20 hp., manufactured by the Falk Company, Milwaukee, under license from the M. Rumely Company, for which preliminary investigation has disclosed a very large demand. This will add to its selling line, but will also require additional facilities at branch houses for storage, repairs, etc.

A thorough survey of the situation convinced the company that the development of its business must cease or it must immediately increase the facilities for manufacturing and marketing its products. This could be done only in two ways. One would be by building additional factories, by increasing the accommodations at branch houses and by establishing new branch houses and storage facilities, which would unavoidably involve considerable delay, tie up a large sum of money during construction and not enable the company to avail itself of the 1912 season. The other course would be to acquire manufacturing plants and branch houses already established at desirable locations. After the most careful consideration and investigation, it was decided to acquire existing plants, which resulted in the purchase of the factories and other assets and business of the two companies previously named, which have branch houses at the many points at which the M. Rumely Company has either no buildings or is using leased quarters no longer suitable or adequate for its needs. The combined sales expense of the three companies has been about $1,700,000 annually, which amount, by readjustment, would suffice to move at least 50 per cent. more product. Further, each of the three factories can be specialized to fewer products, obviating the necessity of manufacturing a great variety of things in limited quantities.

The Western Conduit & Mfg. Company.—The Youngstown Sheet & Tube Company, Youngstown, Ohio, has acquired a large interest in the Western Conduit & Mfg. Company, Chicago. The capital stock of the latter company has been increased from $50,000 to $100,000 and the following officers have been elected: L. J. Campbell, president; W. J. McKay, vice-president and general manager; J. H. Rogers, secretary and general manager of sales; C. C. Rose, treasurer. The foregoing, together with Richard Garlick, constitute the board of directors. It is the intention of the company to build at Youngstown a modern factory of large capacity for the manufacture of its well-known rigid conduit Harveyduct as well as a factory for the manufacture of Realflex, the new flexible armored conductor, which the company has recently put on the market. It is probable that the increase already made in the capital stock will not be sufficient to take care of the improvements planned; in such case, further additions will be made. It is expected to have the two new factories at Youngstown completed next spring.

At the annual meeting of stockholders of the Connellsville Mfg. & Mine Supply Company, Connellsville, Pa., A. D. Soisson was elected vice-president to succeed Clair Stillwagon, deceased.

Shop Erection and Testing of All Important Work

What reason can there be why transmission machinery, any more than any other, should be made and shipped and erected in place without shop assembling and testing to insure accuracy of dimensions and fitting and correctness of adjustment and operation? Who would buy and set up in his power house an engine whose parts had not previously been brought together and operated as a complete machine? Who would care to do the fitting and testing and adjustment and correction necessary to bring any important system of mechanism into proper operating condition? What millwright has not spent hours or days of time and possibly dollars and dollars of somebody's money in the work of installing a system of transmission equipment which came from the maker with some misfits or errors, small or large, that would certainly have been discovered if the machinery had been corrected at the factory, where every facility was at hand for quick and easy alteration and fitting, or replacement of defective parts?

The desirability of shop erection is so patent as to cause wonder that any work of importance should ever be shipped without receiving this essential attention. There is, however, a reason why it is not universally in practice, and this reason is closely related to the carelessness all too common in the design and construction of ordinary grades of transmission equipment. Of course, one would think it even more necessary to assemble equipment of mediocre sort than to take this means of making sure of correct fitting in machinery of higher grade, made with care in every detail. But this is not the way it works out. The careless manufacturer is careless also of results, and puts up to the purchaser the matter of correcting all constructive errors. Conversely, the maker of high grade equipment carries through to a proper and logical conclusion his policy of care in details and of accuracy in results.

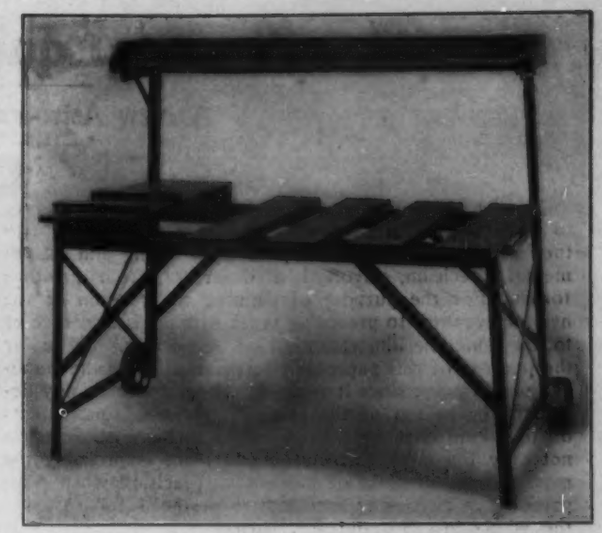
Of scarcely less importance than the complete assembling of such machinery is its thorough testing in motion, up to or even beyond the speed at which it is to be operated. Such testing affords opportunity for adjustment of clutches and bearings; for checking the "balance" and true running of pulleys and sheaves, and the action of self-oiling devices in the bearings, the location of pulleys and sheaves along the shaft, the straightness of the shafting itself, etc.

The Dodge Mfg. Company, Mishawaka, Ind., in calling attention to the points given above, states that at its factory every job of importance is erected complete and is tested for whatever period may be necessary to permit close inspection of every detail, proper adjustment of clutches, etc. This invariable and invaluable practice is a distinctive feature of the company's idea as to what constitutes really right product and service to its customers and is in no small measure responsible for the exceptional ease and speed with which Dodge equipments are installed, as well as for the absence of vexatious delays and stoppages for readjustments after operation has begun. Many an order for Dodge machinery has been placed upon this basis—sometimes as a fundamental consideration of essential importance.

Portable Molder's Bench

To enable molders to be moved away from a cold window in winter and out of the rays of the sun in the summer, a new type of portable bench has been brought out by the Sand Mixing Machine Company, 220 Broadway, New York City. Beside this feature the bench also possesses the advantage of being capable of movement to the sand pile, which is quicker and cheaper than to move the sand to the bench while in addition the expense of shoveling the sand in a pile as well as the time and labor of carrying out the molds is saved.

The bench is made of angle steel with the exception of the molding table and the equipment shelf, which are of 1¼ and ⅞-in. lumber respectively. The bench weighs about 95 lb. so that it can be easily moved by one man to any desired position. The use of iron and steel in its construction makes the bench practically indestructible and at the same time very rigid. There is a sliding shelf underneath the molding table which has a movement of about 18 in. that can be used to hold a riddle and can be slid in out of the way when not in use. It is said to be adapted equally well for either stationary or portable molding. In the former case the bench can be moved from one portion of the sand pile to another, while when portable work is being handled the bench is moved from one part of the foundry to the other as is desired.



A New Type of Portable Molder's Bench Made by the Sand Mixing Machine Company, New York City

American Rolling Mill Company Entertains Culvert Manufacturers

On December 8 the American Rolling Mill Company entertained the members of the National Corrugated Culvert Association at its works in Middletown, Ohio, following the annual convention of that body in Chicago. They were taken to Middletown in special cars, conveyed to the company's works in automobiles, and escorted through both the Central and the mammoth new East Side works. After inspecting the two mills and the company's extensive research laboratory, the party repaired to the Elks Temple, where a banquet was enjoyed. Excellent addresses were delivered, the speakers being John S. Beall, president, and Ray Frazer, secretary, of the National Corrugated Culvert Association, and R. C. Phillips, secretary, and G. H. Charls, assistant secretary, of the American Rolling Mill Company. The manufacturers who compose this association produce approximately 80 per cent. of all the metal culverts furnished in this country, and use American ingot iron exclusively for this purpose, because of its rust-resisting properties.

Diffusing Noxious Chimney Gases

A chimney for diffusing the products of combustion into the atmosphere, the upper portion of the shaft being pierced by a large number of holes, was recently illustrated in the Zeitschrift des Vereines deutscher Ingenieure. It is designed to overcome the damaging effect on vegetation of the sulphurous products of combustion. It is felt that chimneys of lofty hight do not meet the problem altogether, particularly if the upper strata of the atmosphere are quiescent. A chimney about 100 ft. in hight was shown with the topmost part of the shaft, for a length of about 21 ft., pierced with conical holes with the larger openings in the outside face of the chimney. The wind enters freely into the chimney through these holes, diluting the smoke and developing a vortical action. Through the side opposite to the wind the quantity of gas which will escape through the holes is generally of little importance, because of the shape of the holes. It is held that the vortical action, together with the diffusion within the top of the chimney, reduces the diameter of the zone of vegetation endangered by the sulphurous gases.

The Turret Equatorial Telescope*

A New Astronomical Observatory

BY JAMES HARTNESS†

A new astronomical observatory to allow the observer to work in comfort, independent of the outside temperature without serious handicap to good seeing and instrumental precision, involved a departure from previous forms. For the purpose of defining the relation of the new observatory to preceding types it is necessary to refer to diagrammatic illustrations, Figs. 1, 2 and 3. Fig. 2 for the purpose of this paper will be referred to as the standard observatory, since it represents a type most highly developed by reason of the greater number of instruments of this kind that have been made. This instrument is not only the most efficient optically, but is probably the most reliable in point of mechanical precision when compared with any other instruments designed for covering the whole heavens and for general purposes. Fig. 1 is known as the equatorial coudé, or elbow equatorial. This instrument was designed to shelter the observer in comfortable quarters. It is of French origin and a number of these are in use in Paris and elsewhere. Fig. 3 is a schematic sketch of the new instrument which we propose to designate as the turret equatorial.

Details of the New Telescope

In the present instrument the direction of the beam of light is changed, but instead of using a large mirror near the objective a prism is used nearer the eyepiece. The area of the bundle of the cone of rays at the prisms is approximately one-sixteenth of the area of the object glass. By avoiding the use of large mirrors there is, of course, the optical gain, and the mechanical difficulties encountered in holding these large mirrors without flexure are also obviated. The means employed to shelter the observer and provide suitable mounting and control for this telescope may be briefly described as a building having a turret-like dome, this dome being mounted to rotate on an axis parallel to the axis of the earth.

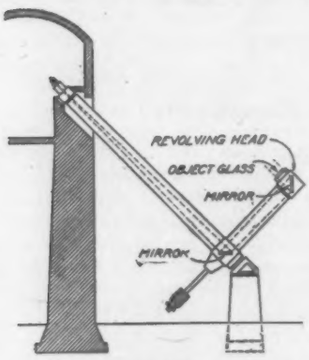


Fig. 7—Equatorial Coude

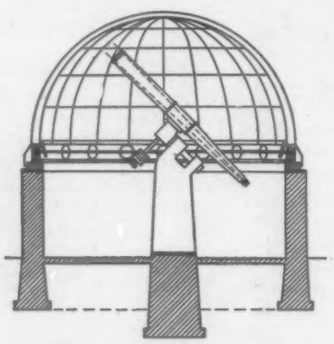


Fig. 2—Standard Equatorial

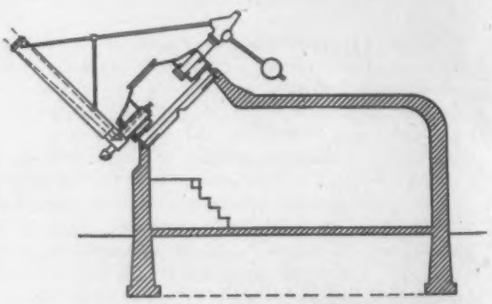


Fig. 3—Turret Equatorial

Diagrammatic Sketches of Two Common and a New Type of Telescope

It is perhaps well to bear in mind that the distances between the instrument and the celestial objects are so great as to be practically infinite; hence, in saying that the turret is mounted on an axis parallel to the earth's axis, it will be just as well for our present purpose to consider it located at the axis of the earth. Furthermore, in considering the joint between the telescope and the turret, it will be more readily understood if we regard the pivotal connection of the telescope tube to the dome as located directly in the middle of the turret instead of at one side.

Regarding the mechanical precision of the present instrument, it is very natural to question the reliability of a turret in serving the place of an arbor for the main polar axis. This axis not only provides a control of the motion of the telescope as it follows a star in offsetting the earth's motion, but it also must combine with it some means for knowing with considerable precision a reasonably exact reading of the hour position or right ascension of the object. These two things make it necessary to provide the turret with a perfectly planed surface on its under side and a truly circular track. It also requires in the building a stable mounting for rolls on which the turret rests.

There are two sets of rolls: one set on which the flat face of the turret rests must keep the axis of the turret parallel with the axis of the earth. The circular part of the turret bears on the other set of rolls. The office of the second set is to hold the axis of the turret in a fixed position relative to the building to facilitate convenience in measurement of the angular position of the telescope as to hour position or right ascension. If we can assure ourselves of the reliability of the turret for axial control and means for measuring the angular position of the tube around this axis, the author thinks we should be ready to accept the present scheme on account of its making possible the comfortable housing of the observer.

In mechanism for obtaining the greatest precision of axial control of a rotating object, machine designers invariably prefer an arbor of relatively small diameter mounted in two bearings, with the distance between the bearings of at least half a dozen diameters. Small diameters also furnish a most reliable center control around which to measure angular position. In the present case as in nearly every problem of machine design, there are other elements to be considered. The best solution is to determine what compromise to make.

Means for Controlling Movement

In all equatorial telescopes provision must be made for changing the angular direction of the telescope to and from the pole; in other words, north and south. The axis on which the telescope turns for this position of declination must stand at right angles to the polar axis. In the new instrument the telescope is not pivoted at the middle, but at a point near the focus, and it is at this point that the prism is introduced and the rays are delivered into the turret through the hollow declination axis. The scheme of counterweight resembles in some respects the old-fashioned well sweep. The counterweight is fulcrumed at the opposite side of the turret and reaches over to a point near the head of the telescope, supporting it without adding the weight to the telescope head and thus relieving a part of the weight of the declination axis and also all torsional strain.

This well sweep acts also as a brace in one direction. When the turret has been turned so that the declination axis is at the lowest part, and the tube has been pointed directly to the pole, then the counterweight is inoperative as a counterweight for the tube, but the arm becomes a brace. Therefore this scheme changes from one that is wholly a counterpoise to one that holds the telescope in position by a diagonal brace, and there are positions in which there is an equal service of each in the change from one extreme to the other. The brace always operates to

*From a paper presented at the annual meeting of the American Society of Mechanical Engineers, New York, December 6, 1911.

†President, Jones & Lamson Machine Company, Springfield, Vt.

stiffen the instrument against the action of the wind in certain positions and the exact form may be varied to get the best results. The one shown in Fig. 4 was made to use available material.

The means for controlling the declination position of the telescope is a wormwheel in which two worms engage. It will be seen that the observer sits inside the dome and receives the light coming from any celestial object above the horizon; and although it is necessary for him to change the position of the chair about 1 ft. east and west and 3 or 4 in. vertically, such a change does not constitute any serious inconvenience. The beam of light comes into the observatory in a horizontal position when the telescope is pointed along the meridian, and it changes from the horizontal position to one in which the observer looks down toward the north at an angle of about 45 deg. at this latitude. The control of the dome, both for its quick motion for changing from one position to another, and also for providing movement to offset the rotation of the earth, is all effected by levers within convenient reach of the observer.

The rotation of the dome, instead of being effected by a wormwheel or gearing directly connected to the dome, is through the means used for driving four of the supporting rolls bearing on the circular track. They are hardened and ground to the proper diameter to get the desired relation of speeds. All of the other rolls are merely idlers for maintaining the fixity of axis of dome, and all rolls are mounted in ball bearings to reduce the total power required in turning the dome. Ball bearings keep the resistance more nearly uniform than could be maintained with plain bearings.

Fig. 4—An Exterior View of the Observatory

Data Regarding the Turret Equatorial

Some of the principal points of interest about the telescope are given below:

Object glass, 10 in. in diameter, and 150 in. in focal length.

Inside dimensions of building, 6 ft. by 18 ft.

Outside diameter of dome, 7 ft. 4 in.

Weight of dome casting, about 1½ tons.

Total weight of dome with counterweight, tube, etc., about 2 tons.

Weight of ring-casting on which the dome is mounted, 1½ tons.

The optical parts were furnished by The John A. Brashear Company, Ltd. All of the other work was homemade, except the two large castings which were cast and turned in Fitchburg, Mass.

The hour circle consists of a flat ring having approximate dimensions of 52 in. outside, 48 in. inside, and ¾-in. thickness.

The inner diameter is graduated down to divisions of 1 min. These divisions are about 0.1 in. apart. Vernier edges were provided for division of the minutes into seconds, but thus far a crude substitute has been used in preference. It consists of a rotating dial driven by gearing which also turns the dome. Its connection is such that the dial makes 1 r.p.m. With the 60 graduations on dial the division of the time into seconds is very readable.

In use the hour circle may be set to the even minute of position, leaving the plus or minus of seconds to be allowed for at the zenith point by the timepiece.

The declination wormwheel is 24 in. in diameter, and is provided with two worms located on opposite sides. These are rotatively connected by means of a cross shaft and spiral gears.

To prevent conflict of action an eccentric bearing is provided for accurately gauging the depth of engagement of each worm. A separate means for turning each a very slight amount is also provided.

Graduations for minutes of degrees are carried by hubs on worm shafts.

The Winona Technical Institute

The fate of the Winona Technical Institute, at Indianapolis, Ind., has been practically settled by the decision of Judge Clark of the Circuit Court at Danville, Ind., to whom the case was taken by change of venue, that the property belongs to the school city of Indianapolis. The Institute has been in the hands of a receiver since 1909, donors to it were presenting claims against it, and the trustees began suit in court against them to ascertain what powers they had and to clear up the title to the property. The Institute has been kept in operation by the receiver and at present has about 100 students. It will take some time to learn the exact position of the Institute, as an appeal may be taken from the court's decision by the donors who have been seeking the sale of the property and the return of subscriptions. The present curriculum will be followed until all disputed points are finally settled.

The International Harvester Company's new factories at Lubertsy, Russia, were recently formally opened. These factories have been under construction a little over a year and a half and when running full force will employ about 1100 men. They comprise six buildings, which will be devoted to the manufacture of mowing machines and other agricultural implements. The equipment was obtained almost entirely in the United States. Owing to the numerous holidays in Russia, not more than 260 full working days can be counted on in each year.

Four more hot mills have been started at the Elwood plant of the American Sheet & Tinplate Company, at Elwood, Ind., making 12 now in operation. It is expected that the number of mills will soon be increased to 16, in view of the improving tendency of the tinplate trade.

New Tools and Appliances

This is essentially a news department for which information is invited.

The High Speed Adjustable Reamer.—Under the name of the Ideal adjustable high speed reamer the McCrosky Reamer Company, Meadville, Pa., has placed on the market a new type of reamer. Two solid blocks of high-speed steel with conical ends are held on the arbor by two collars and there are four left-hand spiral cutting edges milled in the solid head. By lowering the rear collar and tightening the front one, which forces the reamer head up the inclined surfaces of the arbor, the necessary adjustment is effected. With the 2-in. reamer it is possible to secure an expansion of nearly 3/32 in. in this way. If desired the right-hand spiral flutes can be furnished.

A 12-in. Back Geared Crank Shaper.—L. E. Rhodes, Hartford, Conn., has recently developed a 12-in. crank shaper especially designed for the use of high-speed steel tools. Six speed changes are available, three having a ratio of 5 to 1 and the remainder having a ratio of 10 to 1, the knob in the driving cone pulley controlling the changes. The table is fastened to the cross rail by a wedge-shaped gib, in order to insure a solid bearing surface throughout its entire length. The head is graduated, can be set at any angle and is fastened to the ram by a positive clamping device. The vise has a swivel base, and has its jaws faced with tool steel. These jaws are 9 in. long, 2 in. deep and have a maximum opening of 6 in. The finest feed is 0.005 in.

Steam Drop Hammer.—A new line of steam drop hammers has been recently designed by the Buffalo Foundry & Machine Company, Buffalo, N. Y. Open-hearth steel is used for the anvil base of the tool, the weight of which is approximately in the ratio of 20 to 1 as compared with the weight of the falling parts. The lower die holder is a hammered steel forging and is secured to the anvil base by a key. Open-hearth steel castings with recesses into which the adjustable V-guides for the hammer head are fitted are employed for the columns. Provision for taking up wear is made by inserting a taper gib between the guides and the columns. Vanadium steel is used for the hammer head, and the piston and the hammer rod are made from a solid nickel-chrome vanadium steel forging having an elastic limit of 85,000 lb. and a tensile strength of 120,000 lb. Two cross tie bolts and a steel cap plate gibbed both to the cylinder and to the frame at its outer end hold the frames together at the top. A balanced piston valve motion is employed, which has a removable sleeve in the piston valve chest. The steam and exhaust pipes have expansion joints and the latter is arranged so that no water can remain in the bottom of the cylinder.

Combination Center Drill Sets.—Combination center drills in sets have been lately placed on the market by the J. T. Slocomb Company, Providence, R. I. In this way it is possible to have drills of the proper sizes to take care of the different pieces of work without buying a dozen of each size in a box or single ones separately. These sets are packed in wooden boxes and contain one each of the eight sizes of drills regularly listed in the company's catalogue. In this way it is possible to have the right size of drill available for work without having to hunt around for it. In common with the other drills made by this company, semi-high speed steel is used and it is claimed that these drills do more work than it is possible to secure from the ordinary carbon steel drill.

A Special Three-Spindle Drilling Machine.—For drilling the three core holes in the contactor pole pieces of electric motors simultaneously and also tapping them simultaneously, the Newton Machine Tool Works, Inc., Twenty-fourth and Vine streets, Philadelphia, Pa., has recently brought out a special multiple-spindle machine. The spindles are 1⅞ in. in diameter, and are fitted with a No. 4 Morse taper, with retaining and drift key slots. The center spindle bearing is cast solid with the saddle and those for the two outer spindles are adjustable on the saddle to give a center distance varying from 3¼ to 10 in. The drive to the center spindle is by a belt connection from the motor to intermediate spur and bevel gears while the power for the other two spindles is transmitted through intermediate steel spur gears from swinging arms provided with an extension for bolting them securely in position when properly adjusted. A friction clutch controls the engagement of a 2 to 1 speed reduction and a reverse motion for tapping. Hand vertical adjustment and reversing power feed with two belt changes are also provided. The capacity of the machine is 1¼ in. for drills and ¼ in. less for taps, the maximum speed being 200 r. p. m. for drilling and 50 r. p. m. for tapping. The maximum distance from the ends of the spindles to the top of the work table, which is 18 in. wide and 30 in. long, is 20 in. A tank for lubricant is mounted in the base of the machine and the equipment includes a pump and the necessary piping.

Horizontal Cylinder Boring Machine.—For boring and facing the cylinders of steam, gas and gasoline engines; pumps and locomotives, the Barrett Machine Tool Company, Meadville, Pa., is building a new pattern machine. The new tool is mounted on heavy bed and is equipped with two facing arms mounted on the ends of sleeves. A friction drive is employed and the arms can be started and stopped at will by simply tightening or releasing a collar bolt. When work is not being done, these arms hang on the ends of the sleeves and do not interfere with the rotation of the boring bar or the longitudinal travel. A sliding block which travels at right angles to the 5-in. boring bar is fed in and out by a star feed and a secondary block is mounted upon this which carries the tool for facing off or turning the outside diameters of the cylinder flanges. The boring bar has a continuous feed travel in either direction of 48 in. and will bore a cylinder of this length at one setting. The end is fitted with a No. 6 Morse taper hole with draw and drift slots so that, if desired, smaller bars can be used. When this is being done, a sleeve is placed in the tail pedestal bearing for supporting the outer end of the smaller bar. The machine is equipped with a quick change feed box mechanism by which ten different feeds ranging from 1/32 to 7/16 in. per revolution of the boring bar are instantly available. The power for the feeding mechanism is transmitted by a Hindley type worm and worm wheel having a double left-hand thread. Either belt or motor drive can be used with the machine. With belt drive, a four-step cone pulley is employed and this number of changes is doubled by the use of two friction pulleys on the countershaft. When motor drive is used, four quick changes can be secured, the motor being mounted on a bracket bolted to the side of the machine and belted to the driving shaft. This arrangement places the motor out of the way of dirt and chips and at the same time no additional floor space is required.

Grinder Dog.—A grinder dog having a double jaw, the position of which can be reversed to adapt it to a large or small work has been developed by T. F. Barter, Holt avenue, Worcester, Mass. There are two V's in the jaw, a large one on one side and a smaller one on the other so that by simply changing the position of the jaw it is possible to hold very small work. In addition to this adjustment the dog is provided with side screws holding the two drop-forged parts which form the dog together. After these screws have been set to a given size, they are prevented from shifting by check nuts. Four sizes of dogs, having maximum capacities of 1½, 2½, 4 and 7 in., are made.

Crank Shaft Sawing Machine.—A recent product of the Newton Machine Tool Works, Inc., Twenty-fourth and Vine streets, Philadelphia, Pa., is a rapid production crank shaft sawing machine, operating two 32-in. blades, simultaneously. The capacity of this machine is a cut 9½ in. deep and when fitted with a milling cutter it will finish the cheeks of the crank shaft without sawing. As is the custom in machines of this type the spindle is supported at each end in capped bearings and the driving gear is located between the bearings. The worm and worm wheel driving mechanism are of solid bronze and hardened steel respectively and are incased to secure continuous lubrication. Six speed changes are available through a gear box and power quick return is also provided. Adjustable automatic stops are fitted to the saddle to release the feed and the fast traverse at any predetermined point. The saw blades are driven by two broad keys and together with the collar are held in place by a 4-in. hexagonal nut. The maximum gap between the saw blades is 4 in. and spacing washers are provided to give a variation of 1 in. The machine is driven by a 20-hp. motor running at a speed of 720 r.p.m.

Trade Publications

Air and Vacuum Pumps.—J. Gilmer Crowell, 296-298 Taaffe place, Brooklyn, N. Y. Two circulars. The first, No. 100, illustrates two types of positive pressure blowers or rotary air pumps which are adapted for all purposes where air at a pressure of from 1 to 10 lb. or a vacuum not exceeding 24 in. is required. The principle of construction is the same in both types, an internal drum or shaft carrying the sliding blades or pistons that operate in close contact with the cylinder wall, all springs, valves, gears or unbalanced parts having been eliminated. Nine sizes in all of blowers ranging in capacity from 6.9 to 392.3 cu. ft. of free air per minute are built. No. 101 treats of the maker's standard type D rotary air compressors which are manufactured in nine standard sizes of from 4 to 392 cu. ft., and a maximum working pressure of 25 lb. These pumps can exhaust to a vacuum of from 29 to 30 in. of mercury. One of the special features of this pump is that when it is used as an air compressor no changes are necessary to convert it into a vacuum pump. Illustrations of the various types of pumps are given in the circulars, together with dimension tables.

Portable Metal Punch.—W. A. Whitney Mfg. Co., Rockford, Ill. Mailing card. Deals with the No. 1 portable hand metal punch of this company which will punch a 9/16-in. hole through a ¼-in. boiler plate. This tool is made with drop-forged parts and was especially constructed for boiler, tank and stack work.

Oil Engines.—De La Vergne Machine Company, 1152 East 138th street, New York, N. Y. Folder. Refers to the FH and HA engines of this company which are designed for operation on crude oil, distillate and cheap fuel-oils. The various features such as no stand-by losses, space economy and low maintenance cost are briefly touched upon and illustrations of both engines are included.

Triplex Power Pumps.—The Deane Steam Pump Company, Holyoke, Mass. Bulletin No. D-205. Gives an extensive discussion of the construction of a triplex power pump of the vertical double-acting type and explains the advantages of this machine over the other types. The principal advantage claimed for this pump is that the combined discharge from the cylinders is practically uniform in quantity and pressure. The construction of the pump is analyzed at some length and stress is laid upon the simplicity, durability, accessibility and solidity of these pumps. The pumps listed are arranged for belt or gear drive and range in capacity from 11½ to 2475 gal. Nine different styles of pumps are illustrated and tables of dimensions, capacities, etc., are given.

Metal Paints.—The Western Elaterite Roofing Company, 841 Equitable Building, Denver, Colo. Pamphlet. Illustrates some of the uses of Elaterite paint. This is made in three different styles for use as a preservative for structural steel and iron, cars and car trucks, pumps, towers, tanks, pipe lines, railroad work, bridges, etc.; for heated surfaces such as smoke stacks, locomotives and boiler fronts, furnace doors, and also for use on tanks, pumps and pipe lines, in and about cyanide, chlorination and similar plants and for all acid or alkali resisting purposes.

Ore Cars.—Automatic Unloading Car Company, Sellwood Building, Duluth, Minn. Mailing card. Calls attention to a special type of automatic unloading car for handling iron ore built under the Rakowsky patents. Some of the features of the car are low unloading, maintenance and repair costs; safety of unloading and the employment of gravity in unloading and returning the car. A series of tests of these cars has shown an average unloading time of 40 sec. for a 100,000-lb. car.

Pipe Fittings and Unions.—The Kelly & Jones Company, Greensburg, Pa. Pamphlet. Describes and illustrates a line of brass pipe fittings and unions made in a number of different sizes and styles. Tables giving the prices of the various fittings are included.

Core Drills.—McKiernan-Terry Drill Company, 115 Broadway, New York, N. Y. Catalogue. Size, 6 x 9 in.; pages, 68. Describes an extensive line of core drills for inspecting, testing, blasting, etc. After a brief introduction showing the use of the drills in metal and coal mining and in contracting work, the various types of drills are taken up, followed by instructions for setting up and operating the tool. Numerous half-tone engravings showing these drills in use and the cores obtained by them are included. One of the feats described is the drilling of large holes in concrete which was illustrated in *The Iron Age* August 4, 1910.

Automatic Screw Machine Products.—The National-Acme Mfg. Company, Cleveland, Ohio. Sample piece and leaflet. This is an example of the rapid production possible with the automatic screw machine of this company. The piece is about ⅜ in. long and has a maximum diameter of the same amount. The two end portions are turned down slightly, leaving a ring ⅛ in. wide in the center and a ¼-in. hole is bored through the piece. Three of these pieces were shaved, drilled and cut off from the bar of stock in the time it took to form the three by the ability to get at the work four times and in four different positions.

Shapers.—Stockbridge Machine Company, Worcester, Mass. Pamphlet. Gives general description and specifications for the company's two-piece crank shaper. One of the special features of this machine is the patented crank motion that was illustrated in *The Iron Age*, October 3, 1911, by which a high return speed is secured. Other special features which are illustrated are the manner of supporting the driving gears, the automatic down feed to head, the gear box for constant pulley drive and a special type of support for the knee.

Lathes.—Joseph T. Ryerson & Son, Chicago, Ill. Catalogue. Shows the various types of lathes built by the Prentice Brothers Company, Worcester, Mass., for which they are the selling agents. The various types of lathes covered include high-speed geared-head lathes, high-speed geared-head turret lathes, engine lathes and a heavy-duty double back-geared lathe. The construction of these lathes is first described at length with engravings supplementing the text and this is followed by illustrations, brief descriptions and specifications of the various sizes. Various types of turret tool holders are illustrated and briefly described and space is given to the belt and all geared attachments for providing motor drive for the high-speed lathes.

Oil Engines.—The Remington Oil Engine Company, Stamford, Conn. Bulletins Nos. 2 and 3. Deal with the application of the marine stationary oil engine built by this company for electric lighting and pumping work. Views are given of the engine installed for these purposes and information as to the cost and other points is included.

Grinding Wheels.—Norton Company, Worcester, Mass. Wall hanger. Gives instructions for mounting and truing grinding wheels. A table of wheel speeds is given together with one of the circumferences in feet of various wheels, the diameters of which were measured in inches. Rules for obtaining the surface speeds per minute of a wheel with the various other factors known are also given.

Water Wheel Alternators.—Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. Circular No. 1198. Illustrates and describes the various types of vertical and horizontal alternating-current generators built by this company for water-wheel drive. The different types of rotors, each of which is adapted for a certain wheel diameter and speed range, are described, and a number of views of installations, together with engravings of the various parts of the generators, are included.

Multiple-Spindle Drilling and Boring Machines.—Moline Tool Company, Moline, Ill. Mailing card. Shows a number of the various types of multiple-spindle drilling and boring machines built by this company which range from 4 to 12 spindles.

Screw Plates.—Wiley & Russell Mfg. Company, Greenfield, Mass. Catalogue. Deals with a large line of screw plates including a number of sets in leather rolls and wooden cases for automobile repair use. Mention is also made of the company's line of taps, dies and screw cutting machinery and tools. About 20 pages of valuable data and tables for mechanics are included.

Gears.—The D. O. James Mfg. Company, Chicago, Ill. Catalogue D. This 111-page book is bound in flexible cloth and in addition to presenting descriptive lists covering the full line of gears manufactured and the O'Kelly speed reducing gears, contains numerous and complete rules and formulae for developing and cutting spur, bevel, worm and spiral gears. This information is arranged in easily accessible form with tables and illustrations and a complete index is included. An illustrated description of the new type of O'Kelly speed reducing gear appeared in *The Iron Age*, August 10, 1911.

Mechanical Stokers.—The American Stoker Company, 11 Broadway, New York, N. Y. Bulletin No. A-2. Illustrations and descriptive matter explain the operation of a line of stokers for various classes of heating furnaces. The construction of these furnaces is gone into at some length and there are a line and a half-tone engraving to supplement the text. Comparisons showing the cost of operating furnaces with oil, coal and natural gas fuels are included.

Scott's Roofing Tin.—Follansbee Brothers Company, Pittsburgh, Pa. Illustrated circular. Describes the process of making Scott's extra coated open-hearth roofing tin. The steel ingots used in making this product are hammered to give the metal the necessary working and wearing qualities, the company's plant, which is at Follansbee, W. Va., being equipped with an 8-ton hammer under which the ingots are hammered instead of being rolled in a blooming mill in the usual way. The company also issues a publication entitled "Tin Truth" for general distribution.

Recorders.—Precision Instrument Company, Detroit, Mich. Mailing card. Calls attention to the Precision dead-beat recorder which is made in over 200 ranges of vacuum and pressure in both English and metric systems.

Sheet Metal Specialties.—Eagle Glass & Mfg. Company, Wellsburg, W. Va. Catalogue A. Deals with a line of sheet metal specialties which include various types of oilers, tallow pots, supply cans, steel buckets and torches. All of these are illustrated and short tables giving the various sizes in which they are made are given below the engravings.

Corliss Engines.—The Vilter Mfg. Company, 1008 North Clinton street, Milwaukee, Wis. Catalogue E. Deals with the line of Corliss engines built by this company, which are of the horizontal type and are designed for both high-pressure and condensing operation. The construction of these engines is given at some length with engravings illustrating the different parts, and also the plant in which the engines are built. There are a number of half-tone engravings showing the engines installed in various plants and tables of dimensions and capacities, together with a partial list of users complete the catalogue.

The Machinery Markets

The movement toward more and better business which has been growing noticeably stronger almost every week in the last two months continues in most of the large centers. As was the case last week, some cities again report an end of the year dullness, but general conditions are improved. New York dealers, who are anticipating two large lists of requirements from railroads and who have had during the week an increased volume of inquiries, assert that the outlook is much better. The Chicago trade has closed negotiations on two lists of $10,000 each and the smaller sales, considered in the aggregate, are said to have been the best in some time. In Detroit a better feeling is manifested and the trend of business is reported good, with notable improvement in several special lines. New England dealers are holding their own and some plants are busy, especially those making grinding machinery and other special equipment. A fair business was done during the week in Philadelphia, although the approaching holidays seem to be affecting trade in that city. Both Cleveland and Cincinnati find business somewhat slow, which is attributed to the season. In Cleveland, however, there is a demand for sugar making equipment and Cincinnati reports a fair export business. St. Louis dealers regard the situation as satisfactory and in the South there is a demand for factory equipment, including electric motors. Municipal plants now under consideration are expected to create business throughout Texas in the course of a few months. The demand from Mexico for machinery of all types is greatly improved after having been at almos a total standstill as a consequence of political troubles.

New York

NEW YORK, December 20, 1911.

Dealers in machinery who are known to be conservative express themselves as much pleased with the outlook in New York, despite their belief a week ago in a temporary setback which they ascribed to the holiday season. Not only is business involving large figures in prospect at the present time, but there has been an increase in the number of inquiries for individual machine tools and small lots. The big list which will set forth the requirements of the Delaware & Hudson Railroad in its Watervliet shops has not been issued yet, but it is in readiness and expected to reach the trade at any moment. The list of the Delaware, Lackawanna & Western Railroad is in course of preparation, and with the Delaware & Hudson list is a cause of more than usual cheerfulness among the dealers. Other business is known to be in prospect but authorization to publish details cannot be obtained at this time. Altogether there is a feeling that very much better business is not far away and a reliable representative of one important machine tool manufacturer said he had made a requisition for extra salesmen. The Pennsylvania Railroad and the New York Central have each purchased a few tools, those ordered by the New York Central including a couple of forging machines.

The Therapeutic Lamp Company, New York, has been incorporated with $100,000 capital stock to manufacture electric lamps, appliances, etc. The incorporators are William A. Soles, Julius Becker and Mason G. Worth, 32 Broadway, New York.

The William R. Thropp & Sons Company, Trenton, N. J., has had plans prepared for a foundry building, 80 x 250 ft., which will be equipped throughout with motor driven devices and a traveling crane.

The American Welded Chain & Ring Company, New Brunswick, N. J., has been incorporated with $25,000 capital stock to manufacture welded wire chains, rings, castings, forgings, etc. The incorporators are C. C. Thatcher, Jr., J. E. Alexander and William E. Sperling, 133 Livingston avenue, New Brunswick.

The Clark Novelty Company, Rochester, N. Y., has acquired the plant of the American Drafting Furniture Company at Railroad avenue and East Main street. The company plans to make improvements and will erect a brass foundry adjoining.

Turk & Brown, Inc., Rochester, N. Y., has been incorporated with $10,000 capital stock to manufacture motors, engines, etc. The incorporators are John F. Turk, Cornell, N. Y.; A. H. Brown and S. H. Brown, Rochester.

The Pyrites Paper Mill Company, Ogdensburgh, N. Y., will erect an unloading and conveyor plant on the waterfront to transfer pulp wood from vessels to cars for switching to its mill.

The Lundstrom Mfg. Company, Little Falls, N. Y., manufacturer of sectional book cases, has plans in preparation for a four-story addition 80 x 100 ft. to be made to its plant.

The Batavia Rubber Company, Batavia, N. Y., manufacturer of pneumatic and solid rubber tires for automobiles, is having plans prepared for an extensive addition to be made to its plant. The capital stock of the company was recently increased to $500,000 from $70,000.

The Consolidated Rendering Company, Boston, has let contract for erection of a factory building 50 x 100 ft. on Syke street, Rochester, N. Y., to cost about $20,000.

Rumsey & Co., Ltd., manufacturers of power and hand pumps, have secured a new site and are having plans prepared for a larger factory. H. R. Mick is president.

The North Buffalo Hardware Foundry, Buffalo, N. Y., recently incorporated, will equip the foundry building, 65 x 250 ft., it is erecting at Hertel avenue and the Erie Railroad with the latest type of molding machines, tumblers and grinding machines. The directors of the new company are E. B. McKenna and W. A. Griffin, now connected with the Standard Foundry Company, Buffalo; B. H. Prentice, L. F. Gilbert and A. W. Sawyer.

The General Welding Company, Buffalo, has been incorporated with a capital stock of $15,000 to do a general welding business in steel and other metals. The incorporators are Edwin N. and Henry G. Smith and Charles D. Magee, Buffalo.

The Sturdy Smokeless Furnace Company, Buffalo, has been incorporated with a capital stock of $100,000 to manufacture furnaces and boilers under patents of J. Sturdy. The incorporators are J. Sturdy and F. A. Shoemaker, Buffalo; G. Sturdy, Pittsburgh, Pa., and N. H. Sturdy, Cleveland, Ohio. The offices of the company are at 21 Builders' Exchange, Buffalo.

The Little Falls Felt Shoe Company will build a six-story addition to its factory at Little Falls, N. Y., work to be commenced early in the spring.

New England

BOSTON, MASS., December 19, 1911.

The machinery dealers are holding their own in orders booked. The holiday season is rarely marked with good business, relatively speaking, and no material improvement is looked for until the middle of January. A good many men believe that general conditions are improving. They are influenced largely by the reports from the steel industry, but beyond that they feel that the period of a dull market has lasted fully the normal span of years. Various straws show the wind to be blowing from a slightly different direction. It is a significant fact that a large manufacturer of bolts, screws and a wide variety of kindred products is compelled to run a considerable part of his factory with two shifts and every other department is operating at full capacity during the regular hours of production. These products are consumed by practically every industry and the increased demand indicates a revival somewhere. The wire business has apparently recovered from what seemed to a slight let up a few weeks ago.

Manufacturers of grinding machinery, automatics

and semi-automatics are doing a very comfortable business, so, in fact, is practically every house which builds machine tools other than the older standard types, such as lathes, planers, drills and shapers. These latter concerns are finding their chief demand to be for the more powerful, more expensive models. Every indication points to an almost universal intention on the part of buyers to get equipment that will produce on the most economical labor saving basis. Considerations of a scarcity of labor which must follow a return to good times constitute a factor not to be disregarded.

The Lowell Machine Shop, Lowell, Mass., manufacturer of textile machinery, has been purchased by a company, of which Wilmot R. Evans is the president and Robert F. Herrick treasurer. The purchase also includes the Kitson Machine Company, which was owned by the Lowell Machine Shop. It is stated that the two corporations will be operated independently as to direct management. The transaction is especially interesting because the properties have been owned by a group of important cotton machinery houses, the Saco & Pettee Machine Company, Newton, Mass., the Draper Company, Hopedale, Mass., the Whiting Machine Company, Whitinsville, Mass., and the Howard & Bullough American Machinery Company, Pawtucket, R. I. These concerns have had intimate business relationships for a number of years, consequently their release, if the new transaction has that meaning, of the Lowell properties has caused considerable speculation.

The Wire Goods Company, Worcester, Mass., has acquired seven acres of land at Barbers Crossing adjacent to the property of the Worcester Pressed Steel Company. The location is a highly desirable one. The purchase means that the Wire Goods Company will eventually be added to the group of important and successful industries which have located in that suburb of Worcester. However, the management does not propose to move its works from Union street for the present. The purchase is a provision for the future. The company's business has grown very rapidly and the present site restricts any material growth of plant in the future.

The Critchley Machine Screw Company, Worcester, Mass., is about to occupy its new factory in that city. The building is 60 x 152 ft. and one story.

The report is current in Boston that another merger of automobile manufacture on a large scale is imminent. The report grew out of an invitation extended to Charles J. Glidden to head the company. It is stated that the consolidation will center in Detroit.

The Industrial Development Company of the Boston Chamber of Commerce is proceeding actively toward the establishment of a fund of $500,000, the purpose of which is to assist by loans small and growing industries. Boston is moving with a great deal of energy in the effort to attract new industries. Already considerable success has been had. The Chamber of Commerce plan, it is understood, is along the line of policy which was originally established in the South of assisting worthy enterprises to borrow beyond their borrowing capacity with banks.

The shops of the Millbury Machine Company, Millbury, Mass., were burned December 15. The company manufactures textile machines. The plant is an old one.

It is announced at Bristol, Conn., that hereafter the Bristol Brass Company and the American Silver Company will operate under separate managements. Julian R. Holley will be secretary and treasurer of the Bristol Brass Company only, while Samuel B. Harper will be secretary and assistant treasurer of the American Silver Company. President Albert F. Rockwell, of the New Departure Mfg. Company, has been elected president of both companies, while Pierce N. Welch has been made vice-president of the Brass Company and Dean Welch vice-president of the Silver Company.

Philadelphia

PHILADELPHIA, PA., December 19, 1911.

A fair volume of scattered business has been put through during the week, although transactions have been confined almost entirely to single tools and usually those of the smaller class. A somewhat better inquiry has been coming from the local railroads, but while quotations are going in it does not seem assured that purchases will be made. Some bidding of a tentative nature has been done on general machine tool equipment, for the purchase after the year end, and with the continued improvement in iron and steel lines the trade looks forward to a better buying movement after the annual accounting period has passed. Builders of tools note no important changes in general conditions; here and there some fair business develops, particularly in special tools, but instances where plants are fully engaged are few. In the second-hand machinery trade a fair business is passing, but the demand is irregular. Several fair projects in power equipment are under negotiation or in sight. Power transmission equipment continues in moderate demand. Slightly better conditions are reported in the foundry trade although average production shows little change.

The William Steele & Sons Company has begun work on the new factory building to be erected at Twenty-fourth and Locust streets, for the Lanston Monotype Company. The building will be six stories about 77 x 276 ft., with a wing 45 x 109 ft. It will be of fireproof construction.

The Pennsylvania Railroad has sent out inquiries, not under a general list, but in the nature of single inquiries for a boring mill, milling machine, several lathes, including a speed lathe, and a nut facer. No definite action as to the placing of orders against these inquiries has been taken.

J. J. Harpel, Macungie, Pa., manufacturer of stoves and light gray iron castings, advises that his plant, which was destroyed by fire about a year ago, has been rebuilt and that it is expected to be in full operation by the first of the year.

M. L. Cooke, director of public works, city of Philadelphia, will receive bids until December 26 for various supplies for the Bureau of Surveys. These will cover requirements for the grade crossing, sewage disposal, sewage and bridge divisions. General supplies and equipment are included.

Dienelt & Eisenhardt, Inc., are operating their plant at full capacity. Considerable business has been taken the past week, including an order for a large printing machine for oil cloth work. Several orders for Lovekin pipe-expanding machines have been booked, while business in Monarch motors is also reported as being good. This concern has recently added to its machine tool equipment and is still buying, although no definite purchases are being considered at this time.

The Trenton Power Company, Trenton, N. J., has had plans prepared for a brick and concrete power house 50 x 100 ft., one story. Particulars regarding equipment requirements are not available.

Ballinger & Perrot, engineers and architects, have, it is stated, invited estimates for a club house, to be erected at Twenty-third and Ludlow streets, for the Automobile Club of Philadelphia. The building will be of concrete and brick, built on concrete piling. The first story will be equipped for garage purposes with provisions for supply parts. The second story will be used for automobile storage as well as for general club purposes. Boiler and engine rooms will be located in the basement, in which will also be located a heating plant, vacuum cleaning system, compressed air system, lighting plant and pumps. One large automobile elevator, 10 x 25 ft., and two 9 x 20 ft., as well as a passenger elevator are to be installed. Pumps and storage tanks for oil and gasoline are also to be provided.

Permits were taken out a few days ago by C. F. Shivers for the erection of an ice-manufacturing and ice-storage plant to be located on the West Chester & Philadelphia Railroad near Whitby avenue, for the American Ice Company. The buildings include a three-story freezing and distributing building, 31 ft. 6 in. x 99 ft., a two-story engine and boiler house and a one-story storage building.

Chicago

CHICAGO, ILL., December 19, 1911.

Two purchases of machinery amounting to $10,000 each were made by manufacturing interests located near Chicago during the past week. These purchases were distributed to a number of manufacturers. These were the largest items in an aggregate which made the week a better one from the standpoint of volume of sales than has been enjoyed for some time past. One of the railroads which has been inquiring for a moderate list of machinery has purchased a part of them, but other railroad requirements apparently are waiting upon requisite funds. The one very large railroad inquiry which has had the attention of local machinery men for some time past seems possible of being placed in the near future although no definite purchasing plan has been arranged. Projected plans are coming to light which should bring into this market an immense quantity of machinery for railroad shops. The Lake Shore & Michigan Southern, as has

been previously reported, is preparing for a large yard and shop group near Gary, and the Pennsylvania Railroad is understood to be considering the location of yards and shops near Chicago for the Fort Wayne and Pan Handle Systems, which have their terminals here.

The Stewart & Clark Mfg. Company, Chicago, has taken out a permit for the erection of a one-story fireproof machine shop on Wolfram street, to cost $3,300.

The United Car Company, Chicago, has been incorporated with $30,000 capital stock to build, repair and deal in cars, engines and railroad equipment. Incorporators are J. R. Owens, S. C. Abbott and A. O. Berg.

The Federal Truck Company, Chicago, incorporated with $10,000 capital stock by Carrew W. Rhodes, David F. Rosenthal and Leo S. Rosenthal, will manufacture automobiles, trucks, etc.

The Ajax Forge Company, Chicago, is erecting a one-story brick pattern shop at 2499 Blue Island avenue.

John M. Jones, Chicago, will build a two-story brick foundry at 1243-1245 West Fulton street.

The Flexo Motor Company, Springfield, Ill., has been incorporated with a capital stock of $30,000 by Fred C. Miller, William Wishart and Otto Butzke. The company will manufacture mine motors, mine supplies and machinery.

The North Shore Consolidated Gas Company, Waukegan, Ill., has awarded the contract for a new $100,000 factory building in that city. New machinery will be installed.

The Carr & Adams Company, Des Moines, Iowa, is planning to spend $25,000 for new machinery to be installed in a plant recently leased and to be used in the manufacture of sash and doors.

The National Brake & Electric Company, Milwaukee, Wis., is about to prepare plans for the erection of a new iron foundry to be completed during the coming year.

The Falk Company, Milwaukee, Wis., in order to provide facilities for the manufacture of the Falk kerosene engine, is building an addition to its plant 80 x 150 ft.

The Kissel Motor Company, Hartford, Wis., has increased its capital stock from $400,000 to $1,000,000.

The American Malted Food Company will erect a factory of concrete construction at Waukesha, Wis., at a cost of $25,000.

The Kent Mfg. Company, Fort Atkinson, Wis., has been compelled because of its greater requirements of space to construct a new plant and abandon its present quarters, which are offered for sale.

The International Hoist Company, Antigo, Wis., manufacturer of contractors' equipment, is having plans prepared for an entire new plant, consisting of a machine shop, wood shop, foundry, assembling room, storehouse, office, etc. The machinery requirements have not been prepared as yet.

Cleveland

CLEVELAND, OHIO, December 19, 1911.

The local machine tool market is feeling the effect of the holiday season and sales have fallen off some since the first of the month. While buyers, as a rule, are holding off until after the first of the year, there is still a moderate volume of scattering business in small orders, mostly for small-sized tools. The demand for second-hand machinery continues fairly active and dealers are not compelled to keep good used tools long in stock. Builders of general machinery regard the outlook promising for a good volume of business early in the coming year.

The demand for sugar making machinery has been quite active recently. A local concern has taken a contract for the erection of a large sugar plant in California, and several similar projects are pending in Ohio and Michigan. Some good business in sugar making machinery has been secured from Cuba.

At a recent meeting of the directors of the Galion Iron Works Company, Galion, Ohio, it was decided to enlarge the company's plant by the erection of an addition 60 x 150 ft. adjoining the present plant. This addition will make one factory building 521 ft. long. It is stated that the present year was the most successful in the company's history and that the growing business has necessitated enlarging the plant. The company manufactures culvert pipe and road machinery.

The General Steel Products & Supply Company, Toledo, Ohio, which was recently incorporated with a capital stock of $100,000, has taken an option on a site on Belmont avenue and Thirteenth street for a plant. Plans are being prepared for some two and three-story factory buildings. The company will fabricate structural steel, reinforcing steel for concrete work and contractors' specialties, such as patented scaffolding and floor-surfacing machines.

Through the efforts of The Massillon Rolling Mill Company, Massillon, Ohio, a plant will be established in that city for the manufacture of steel silos. A factory building 50 x 160 ft. will be erected adjoining the plant of the rolling mill company. The latter company will furnish the concern with steel for the manufacture of silos. This company, the name of which at present is withheld, is now operating a plant in Kansas.

The Dyer Company, Cleveland, has taken a contract for a large sugar plant, with a daily capacity of 800 tons, to be built for the Cooperative Sugar Company, Santa Ana, Cal. Orders for the machinery equipment have been placed.

The Canton-Hughes Pump Company has placed its new plant in Wooster, Ohio, in operation and has moved its offices from Canton to Wooster. The company will continue to operate its Canton plant for a short time.

The Canton Corrugating Company, Canton, Ohio, has completed the installation of its machinery equipment and has commenced the manufacture of its products, which include siding, roofing, eaves' trough, conductor pipe, etc.

The Larrowe Construction Company, Detroit, Mich., has two lists of machine tools out for equipment for beet sugar plants. The lists include lathes, drill presses, radial drills, pipe machines and shapers.

The Imperial-Gordon Rubber Company, Canton, Ohio, has increased its capital stock from $50,000 to $300,000, and is planning plant extensions. A. V. Gordon of Trenton, N. J., has become connected with the company as vice-president.

Tentative plans for a municipal high-pressure pumping station to be erected in Toledo, Ohio, have been prepared. The erection of a plant with a daily capacity of 7,000,000 gal. is proposed, the estimated cost being $214,500, exclusive of the site.

It is stated that the New York Central Railroad is planning to erect a large plant at some point on their lines in Ohio for the repair of steel cars. The site has not yet been selected.

The plant of the Troy Co-operative Foundry Company, Troy, Ohio, was destroyed by fire December 10, the loss being about $12,000. No decision has been reached as to rebuilding the plant.

The Summit Rubber Company, Barberton, Ohio, which was recently incorporated with a capital stock of $50,000, is erecting a new three-story brick plant 40 x 90 ft. L. J. Johnson is the general manager.

The Strong Mfg. Company has decided to locate in Sebring, Ohio. There a new plant will be erected for the manufacture of enameled ware.

The Union Electric Welding Company, Toledo, Ohio, has been incorporated with a capital stock of $20,000 by J. J. Urscher and others.

The American Multigraph Sales Company, Cleveland, has placed orders for considerable additional machinery equipment, including lathes, milling machines, shapers and other tools.

Cincinnati

CINCINNATI, OHIO, December 19, 1911.

The present week shows no change in the situation with machine tool builders, and practically all manufacturers in this section are taking stock and making plans for next year. Several foreign orders have lately been received, and it is quite probable that this particular branch of the trade will make a good showing even during the holiday season.

There is a slight falling off in activity with most of the jobbing foundries, but this is seasonable and is not considered a bad sign.

Much interest is taken in the last quarterly report issued by Secretary J. M. Manley, of the Cincinnati Branch, National Metal Trades Association. Taking the report of June 15, 1907, as standard, the one issued December 15 of this year shows the association plants in this district as operating at 83 per cent., a falling off of 2 per cent. from September 15, 1911, which report showed 85 per cent. activity. The record for the last quarter in each year beginning with the one issued December 15, 1907, is as follows: 1907, 85 per

cent.; 1908, 56 per cent.; 1909, 83 per cent., and 1910, 91 per cent.

The American Rolling Mill Company, Middletown, Ohio, has let contract to the Buffalo Forge Company, through its Cincinnati office, for a hot-blast heating system to be installed in the storage warehouse of the new plant in East Middletown. The heaters are designed to burn either gas or oil and are also equipped with grate bars for burning coal in emergencies. The building is one story, 150 x 698 ft., and 3,790,000 cu. ft. of air will have to be heated.

The Lunkenheimer Company, Cincinnati, held the regular annual meeting of its outside sales agents last week. On the evening of December 12 a banquet was served at the Business Men's Club, at which time Fred. Ravens, Chicago, secretary of the National Association of Stationary Engineers, presented the Lunkenheimer Company with engrossed resolutions of thanks for the many hospitalities extended the delegates of the association during the convention held in Cincinnati last September.

The Cincinnati Precision Lathe Company, whose plans for a new factory have been previously mentioned, has been incorporated with $50,000 capital stock. The incorporators are M. H. Stewart, M. G. Stewart, M. C. Garst, J. M. Tatman and W. C. Tatman. It is understood that work on the new factory will commence at an early date.

It is rumored that the Russell Company, Dayton, Ohio, will erect a large hydroelectric plant for the city of Kimball, W. Va. No particulars are yet available.

It is reported that Bert L. Baldwin, architect, Perin Building, Cincinnati, has been selected to draw up plans for the proposed large hotel to be erected for the Gibson House Company.

O. M. Blake, Hamilton, Ohio, representing capitalists whose names have not yet been made public, bought the plant of the Columbia Carriage Company at a receiver's sale, and it is rumored that the factory will be remodeled and put in operation at an early date.

The Jones Heel Mfg. Company, Dayton, Ohio, is making some extensive alterations and additions to its plant.

The French Oil Mill Machinery Company, Piqua, Ohio, is having plans prepared for a two-story brick factory and office building to be constructed on West Ash street. Architect W. E. Russ, Dayton, Ohio, is drawing up the plans.

The Champion Carbon Company, Cincinnati, whose organization was recently noted, has been incorporated with $100,000 capital stock, and will locate a factory at Loveland, a Cincinnati suburb, for the purpose of manufacturing carbon and carbonized products. Among the incorporators are Andrew, George T. and Arthur J. Morrison, Clay B. Steele and M. L. Buchwalter.

The Whitaker Paper Company, Cincinnati, is having plans prepared by Henry N. Hooper, architect, Cincinnati, for a seven-story reinforced concrete warehouse, to be erected on a plat adjoining its plant on Eggleston avenue.

Detroit

DETROIT, MICH., December 19, 1911.

A slightly better feeling is manifest in the local machinery market and the trend of business is upward. Current sales, while confined pretty generally to single tools and small lots, are of larger volume in the aggregate than was the case early in the month. Inquiries, too, are more encouraging, a number being noted from new industries which are coming into the market for equipment and supplies for the first time. Metal working tools and special equipment lead in activity. Electrical machinery continues in good demand and a good business in water wheels is reported. More irregularity is reported in foundry operations, but the majority of gray iron foundries are booking a satisfactory volume of orders. The second-hand machinery trade is exhibiting a fair amount of activity, particularly in small metal working tools. An increased amount of factory construction work is noticeable in building circles.

The New Era Motor & Mfg. Company, with a capital stock of $50,000, has filed articles of incorporation and will engage in the manufacture of motor car supplies. William R. Smith, George Gilmore and John Scheidegger are the principal stockholders.

The Chalmers Motor Car Company is making a number of minor additions to its plant, the most extensive of which are a final inspection building 75 x 180 ft. and a large two-story storage building.

The Aeroplane Construction & Supply Company has been incorporated with $4,000 capital stock to manufacture aeroplanes and aeroplane parts. The incorporators include Josef Brantigan and Karl Marx.

The Michigan Stamping Company has completed plans for the erection of a three-story brick addition adjoining its present plant on Bellevue avenue, to cost $8,000.

The Brooks Company is the style of a new concern which has incorporated with $10,000 capital stock to manufacture electric washing machines. C. F. Murray, A. J. Walsh and C. H. Brooks are among those interested.

The Precision Instrument Company, maker of recording instruments, has increased its capital stock from $24,000 to $48,000.

The Detroit Steel Products Company has taken out a permit for the building of a one-story brick factory on Joseph Campau avenue, to cost about $6,000.

The Reynolds Roofing Company, Grand Rapids, Mich., has purchased a site of eight acres and will build an entirely new plant on a much more extensive scale than the present factory.

The Creamery Package Company is preparing to start work on its new factory building in the Highland Park district, to cost about $8,000.

The Massachusetts Laundry Company will erect a new factory building at Second and Howard streets, to cost $8,000.

The Stimson Scale & Electric Company has been incorporated with a capital stock of $50,000 to manufacture weighing scales and hardware specialties. The stockholders are Walter F. Stimson, of Detroit, and J. W. McMahon and Peter Donnelly, of Toledo, Ohio. The new concern is in the nature of a reorganization of the defunct Stimson Scale Company and will take over the latter company's plant with the intention of operating on a more extensive scale.

The Acme White Lead & Color Works has filed amended articles of incorporation increasing its capital stock from $2,750,000 to $4,000,000. It is stated that no immediate plant extensions are contemplated.

The Power Multiplex Tool Company has been incorporated with $20,000 capital stock to engage in the manufacture of special machinery. Robert M. McKenzie is the principal stockholder.

The Electric Appliance Company, Muskegon, Mich., has been incorporated with $10,000 capital stock to manufacture and deal in machinery, tools and appliances. The incorporators are C. E. Whitney, R. J. MacDonald and Peter Losby.

The Atkins Mfg. Company, Coldwater, Mich., has been organized by C. A. Bohlin and E. G. Atkins to engage in the manufacture of carburetors. The company has secured factory quarters and will at once proceed with the installation of machinery.

The Holland Carving Tool Company, Holland, Mich., has completed the erection of a new shop to take care of rapidly increasing business. The company manufactures gear cutters and carving tools.

The Simpson Mfg. Company, Homer, Mich., has been incorporated with $100,000 capital stock and has commenced work on a large plant. The new company will manufacture internal combustion engines and vacuum cleaners. The principal stockholders are Eugene Higgins, Herbert A. Simpson and W. J. McIlwain.

F. A. Anderson, Cadillac, Mich., has acquired extensive timber holdings near Alba, Mich., and will erect a large handle mill at that point.

The city of Grand Rapids, Mich., will open bids January 25 for a 350 to 375-hp. water tube boiler for the municipal lighting plant. Information may be had from Samuel A. Freshney, secretary of the Board of Public Works.

The Ruby Mfg. Company, Jackson, Mich., maker of signs, has acquired a new factory site and will erect a new building early in the spring.

The American Brass Novelty Company, Grand Haven, Mich., is erecting an addition to its factory which will double its capacity.

The City Council of Benton Harbor, Mich., has authorized the building of a new pumping station for the municipal water works. Information as to new equipment is not yet available.

The Powell Mfg. Company, Ypsilanti, Mich., has decided to increase its capital stock with a view of enlarging its factory and doubling its mechanical equipment.

The Sterlingworth Chemical Company, of Cambridge, Mass., has commenced the erection at Cadillac, Mich., of a plant for the manufacture of charcoal. The company will put up three buildings at a cost of $25,000.

The Wolverine Brass Works, Grand Rapids, Mich., has acquired additional property, 220 x 250 ft., and is having plans drawn for a factroy building of standard

mill construction and a large addition to its foundry, doubling its capacity.

The Port Huron Bread Company, Port Huron, Mich., will erect a new manufacturing building adjoining its present plant, 70 x 100 ft. and one story.

It is reported that the Michigan Sugar Company, Detroit, has purchased a large tract at Pigeon, Mich., and will erect a beet sugar factory in that city.

Gascho Bros., Bad Axe, Mich., are erecting a large factory building for the manufacture of cement products.

The Vassar Knitting Company, Vassar, Mich., has completed arrangements for the removal of its plant to Bay City, Mich. The company has secured a large factory building and will increase its equipment.

The Vassar Milk Condensing Company, Vassar, has commenced the erection of its new plant. Refrigerating and power machinery will be required.

J. W. Spooner and associates, Grand Rapids, Mich., are planning the construction of a power plant in the West Grand Rapids factory district, with an estimated capacity of 1000 hp.

King's Machine Shop & Foundry has moved from Prentice, Wis., to Sault Ste. Marie, Mich. W. B. King is the proprietor, and not W. B. Prentice, as recently published.

Indianapolis

INDIANAPOLIS, IND., December 19, 1911.

The White River Corporation, Indianapolis, has been organized with $60,000 capital stock, to take over the Noblesville Heat, Light and Power Company at Noblesville, Ind., on White River, 26 miles from Indianapolis. The directors of the company are Alex. R. Holliday, John H. Holliday, Thomas C. McReynolds, L. C. Boyd and H. McK. Landon. The articles of incorporation give power to build a dam and erect a power plant, but the corporation directors say that will not be done at present.

The Brown Bros. Mfg. Company, Nappannee, Ind., has increased its capital stock from $10,000 to $20,000.

The National Dilator Instrument Company, Anderson, Ind., has been incorporated with $50,000 capital stock to manufacture dilator instruments. M. A. Rush is president of the company.

The Fairweight Scale Company, Danville, Ill., has purchased 97 acres on the outskirts of Gary, Ind., to be used as a site for a scale factory. James Fleming is president of the company.

The Anderson Meat Slicer Company has been incorporated at Anderson, Ind., to manufature meat slicers. The incorporators are H. D. Webb, L. S. Webb and N. Baxter.

The Indiana & Michigan Electric Company, South Bend, Ind., has increased its capital stock from $1,915,500 to $2,298,600.

The International Steel & Iron Construction Company, Evansville, Ind., has purchased property which will permit it to enlarge its present plant and increase its structural fabricating business. Added machinery will be installed.

The Gary Screw & Bolt Company, Gary, Ind., which is just now completing its mill building and installing machinery is about to start work on an addition of 120 x 175 ft.

The South Bend Watch Company, South Bend, Ind., is erecting an addition to its plant 33 x 60 ft. and three stories. The addition will relieve congestion in the plant.

The South

LOUISVILLE, KY., December 19, 1911.

While purely local business has been only fair during the past week, trade in the territory at large has been holding up well, and the plants of a good many local manufacturers are running at night in order to take care of the demand. A feature of the situation in the South is the marked activity in the construction of ice factories and refrigerating plants, which require a large amount of equipment, both special machinery and power apparatus being needed. Electric motors and dynamos are in good demand, largely as the result of changes being made in the operation of manufacturing plants.

The Fossee Novelty Company, Louisville, has been incorporated with $25,000 capital stock to manufacture electrical mechanical devices. Lewis Fossee, E. A. Ryans and C. B. Mullen are the incorporators.

The Henry L. Koehler Mfg. Company, Louisville, is establishing a new plant at 431 South Center street, and is installing a good deal of additional equipment. The concern manufactures brass dies, chiefly for use in the box making business.

The Louisville Railway Company is building a large car barn at Broadway and Thirtieth street. Car repair shops are to be located there a little later on.

T. W. Jenkins and W. N. Morris, Atlanta, Ga., have purchased a site in Bowling Green, Ky., and will erect a 40-ton ice factory. The building is now being erected. Those interested have stated that most of the machinery has been ordered.

Plans have been completed by the Midway Ice & Supply Company, Midway, Ky., recently organized, for the erection of an ice factory and cold storage plant. John A. Steele, H. L. Martin, Sr., and others are interested.

The electric plant to be built at Cadiz, Ky., by Alexander Bros., which recently purchased a franchise, will be operated by water power.

The Harlan Town Coal Company, Harlan, Ky, is being organized by B. A. Morton, J. K. Griffin and others of Knoxville, Tenn., for the development of a large tract of coal land near that city.

M. J. Moss, Pineville, Ky., is at the head of a company which has leased coal lands in Letcher County, Ky., near Whitesburg, for the purpose of immediate development.

The Universal Nut & Bolt Lock Company, Newport, Ky., has been incorporated with $50,000 capital stock by George H. Martin, E. F. Brock and Edward Elston.

Plans are being matured by the Eastern Tennessee Power Company, which is completing its hydroelectric plant on the Ocoee River near Cleveland, Tenn., for the construction of an additional plant a short distance up the river, where 60,000 hp. will be developed. The present plant, which is to begin operations January 1, will develop 25,000 hp.

The Southern Trunk Company, Knoxville, Tenn., the plant of which was recently destroyed by fire, is to rebuild in the immediate future. H. L. Ingles is president of the company.

The Allen Mfg. Company, Rogersville, Tenn., has been incorporated with $15,000 capital stock by E. R. Allen, Worth B. Quillan, S. L. Pennington and others.

Meadors, Vaughn & Halleran, Nashville, Tenn., will build a large addition to their ice plant, increasing the capacity to 115 tons a day. The cost of the addition will be $40,000.

The Paris Coal & Ice Company, Paris, Tenn., will erect an ice factory at a cost of $15,000. Work is to be begun shortly after January 1.

The Southern Ice Company, reference to the organization of which, with $5,000,000 capital stock, was made recently, has taken over the plant of the Howe Ice Company, Nashville, Tenn., and has announced plans for the erection and operation of plants in Atlanta and Augusta, Ga.; Jacksonville, Fla., and other Southern cities. The Nashville plant is to be enlarged considerably, a total output of 1500 tons a day being contemplated.

The Cumberland Cedar Pencil Company is reported to be establishing a plant for the manufacture of cedar pencil slabs at Unionville, Tenn.

F. C. McGee is erecting a planing mill at West Point, Tenn. The cost of the mill and machinery will be $12,000.

The Sprague Dairy Company, Chattanooga, Tenn., is erecting a new plant and will install equipment for the manufacture of ice cream.

The Lodge Mfg. Company, South Pittsburg, Tenn., has taken over the assets and good-will of the Blacklock Foundry Company, the plant of which was recently burned, and has erected a new plant for the manufacture of sad irons, grates and special castings.

The South Pittsburg Foundry, South Pittsburg, Tenn., which manufactures soil pipe, reports a considerable increase in business and has enlarged its plant somewhat of late.

The Union Ice Cream & Sanitary Milk Company, Nashville, Tenn., has been incorporated with $16,000 capital stock for the operation of a modern dairy. A building will be erected and equipped with machinery for the handling of milk and the manufacture of ice cream. W. M. Sidebottom, W. E. Drake, F. C. Dorider and others are interested. Mr. Sidebottom has been elected general manager

An ice factory will be erected by the Mt. Pleasant Ice & Bottling Company, Mt. Pleasant, Tenn., incorporated with $10,000 capital stock by J. E. Anderson, James H. Ward, W. D. Cooper and others.

The Standard Blower & Metal Mfg. Company, which has taken over the South Atlantic Blow Pipe & Sheet Metal Company, Jacksonville, Fla., and the Savannah Blow Pipe Company, Savannah, Ga., will continue the Atlanta and Jacksonville plants in operation as at present, but will greatly enlarge the plant at Savannah, it is announced. Blower systems and general sheet iron work will be manufactured. T. H. McMillan is president of the company, with offices at Savannah.

The power plant of the Karges Wagon Works, Evansville, Ind., was destroyed by fire recently, the loss being $3,000.

The Consolidated Canning Company, Jacksonville, Fla., will establish a cannery. Fred. S. Gray is general manager of the company.

A company is being organized at Birmingham, Ala., for the manufacture of sash, doors and other millwork. A. L. Fulenwider, president People's Telephone Company; W. A. and Ross Smith, of the St. Clair Land & Lumber Company, and W. A. Hammond, Acme Coal & Lumber Company, are interested.

The Kimball-Lacey Lumber Company, Arkansas City, Ark., has announced that its sawmill is to be rebuilt at that point.

The Hammond Lumber Company, Hammond, La., has announced plans for the erection of a planing mill at New Orleans, La.

The Danville Plow Works, Danville, Fla., is contemplating the addition of a department for the manufacture of stoves.

The Wheelock-Hammond Heating Company, Birmingham, Ala., has been incorporated with $5,000 capital stock for the manufacture of heating plants. Charles F. Wheeland is president of the company.

The Southern Automobile & Machine Company, Hattiesburg, Miss., has been incorporated with $50,000 capital stock. R. R. Boykin is manager of the company.

Following the issue and sale of bonds by the city of Cuthbert, Ga., plans are being made for the erection of an electric light plant.

Manchester, Ga., has decided to erect an electric light plant, and has authorized an issue of $15,000 of bonds for the purpose.

It is reported that F. E. King is considering the erection of a plant for the manufacture of blow-pipes at Norfolk, Va.

The Butchers' Stock Yard & Abattoir Company, Little Rock, Ark., is contemplating the establishment of a cold storage plant.

St. Louis

ST. LOUIS, MO., December 18, 1911.

The machine tool market this week showed some of the indications of the approaching holiday and inventory season, and in consequence the inquiry was not quite as active as it has been in the recent past. At the same time dealers regard the situation as satisfactory as regards the present, in comparison with what has gone before, and are quite encouraged as to the future. Not much activity is expected from now until after the first of the year.

Arrangements are being completed by Frank Lane, Little Rock, Ark., for the establishment at White Cliffs, near Little Rock, of a cement plant with a daily capacity of 3000 barrels. The financing, in which others are interested, will involve about $3,000,000 for the mechanical equipment and operation of the plant.

The Standard Reduction & Chemical Company, which has the contract for the reduction of the garbage of the city of St. Louis, has completed plans for the removal of its plant to Stallings, Ill., where it will be enlarged in equipment and located in an isolated 800-acre tract.

The Mutual Brewery Company, recently financed by the local retail liquor dealers, has completed the raising of its $150,000 capital and will begin the construction and mechanical equipment work at once.

The Trenton Gas & Electric Company, Trenton, Mo., has been incorporated with $50,000 capital stock by J. T. Menefee, Clarence O'Daniel and Jasper C. Young to equip and operate gas and electric public service plants in Trenton. The establishment of the plants will be undertaken at once.

The Farmer's Union Milling & Supply Company, Tamaroa, Ill., has been incorporated by George Kurtz, C. T. Schmalriede and S. R. Riedelberger, and will equip a flour mill at once.

The C. E. Bonner Mfg. Company, Champaign, Ill., has increased its capital stock from $250,000 to $500,000 for the purpose of increasing its plant and extending its business.

The Perry County Interurban Railway Company, with principal offices in Springfield, Ill., has been incorporated by G. W. McIntire and F. A. Spitznagel of Springfield, Isaac Black of Duluth, Minn.; A. C. Sprague of Dubois, Ill., and William Roessler of St. Paul, Minn. The company will build a road and equip a power plant for traffic through Perry county to Pinckneyville and Duquoi.

The Johnston City Connecting Railway Company has been incorporated to construct, equip and operate a railroad in Williamson county, Ill. The incorporators are W. J. Pearson and T. L. Philips of St. Louis, L. O. Whitnel, H. L. Browning and T. E. Gillespie of East St Louis It is to be a coal road.

The Mississippi River Power Distributing Company, which is to distribute the electric power generated in the hydroelectric plant being built at Keokuk, Ia., at a cost of about $20,000,000, has let the contract for the distribution system in the vicinity of St. Louis and is preparing its plans for the transforming station and equipment which will handle the high tension current received from Keokuk.

A syndicate of business men at Trenton, Tenn., has completed arrangements to build a $75,000 cotton oil mill there. The movement is headed by J. B. Short.

The citizens of Wichita, Kan., voted, December 12, $1,000,000 bonds to be expended in buying and modernizing the present private water plant supplying the city, or in building a new one, as the city officers elect. Another bond issue provided for the construction of a $200,000 public electric light plant.

The A. Braun Mfg. Company, St. Louis, compelled to move by condemnation of its property for the approach site of the St. Louis municipal bridge across the Mississippi, will construct and equip a plant of double its present capacity.

The Okmo Mining Company of Oklahoma has been licensed to utilize all its capital in equipping a zinc and lead mine at Joplin, Mo.

The Macomb Electric Company with a preliminary capital stock of $5,000 has been incorporated at Macomb, Ill., by Willard I. Savige, Edward C. Clay and Hubert B. Hainline for the construction of a plant.

Announcement is made of the completion of plans to construct a cement manufacturing plant at Demopolis, Ala., with an employing capacity of 400 men. The Alabama Portland Cement Company's plant at Spocart, Ala., has been bought by El Paso capitalists and will be remodelled.

The City Gas Company, Ardmore, I. T., has been incorporated with $100,000 capital stock by P. C. Dings of Ardmore as president, J. S. Connelly of Carthage, Mo., and others for the equipment of a gas plant at Ardmore.

The Theiling-Lothman Mfg. Company, St. Louis, has completed arrangements for a large addition to its manufacturing plant and will equip it with machinery sufficient to about double its capacity.

The well-established report is current here that the Iola Portland Cement Company, Iola, Kan., is to be utilized as the parent company for the merging of a large group of Portland cement plants in Missouri, Kansas and adjoining states, the financing involving several millions of dollars.

The Pocohontas Lead & Zinc Mining Company, with $110,000 capital stock, has been incorporated at Kansas City, Mo., by Stanley Watson, Jesse M. Short and E. M. Falk and will equip mining property in the Joplin mining district.

The Cedar Point Light & Water Company, La Salle, Ill., has been incorporated by James Stilwell, Robert W. Richards and Thomas H. Stevenson to equip a public service plant at that point.

The St. Louis Independent Packing Company, St. Louis, has completed plans for the expenditure of $65,000 in extending its plant and mechanical equipment.

The Scullin-Gallagher Iron & Steel Company, St. Louis, Mo., is building an addition to its steel foundry.

The machinery of the Western Woolen Mill Mfg. Company, Topeka, Kan., is being moved to Ellensburg, Wash., where it will be known as the Washington Woolen Mills Company. The concern has a capital stock of $60,000.

The De Soto Roller Mills Company, De Soto, Mo., with $50,000 capital stock, has been incorporated by Henry Levys, John F. Barrett and Elliot E. Crow. It will equip the mills at once.

The Christopher & Simpson Architectural Iron & Foundry Company has taken out a permit to build an addition to its plant to cost $15,000. The equipment has not been ordered yet.

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The Canadian Northern Coal & Ore Docks Company has begun the enlargement of its works at Port Arthur, Ont.

Several large contracts for machinery have been given out by the Canadian Pacific Railway Company for its new coal handling plant at Fort William, Ont.

Land in the vicinity of Edmonton, Alberta, has been purchased by the Canadian Northern Railway Company, and it is stated that large machine shops are to be erected there by the company.

It is announced from Winnipeg that the contract for the Canadian Pacific Railway shops at Calgary was let by Vice-President Bury to the Westinghouse, Church, Kerr Company, New York. It will commence work on the new buildings at once and is to have them finished by the end of next year. They will be of the same size as the Winnipeg shops.

The Canadian cereal merger lost a valuable plant December 15 in the total destruction by fire of the Robin Hood mills at Moose Jaw. The loss will be $200,000. The mills had a capacity of 1500 barrels. This is the third milling plant in the West destroyed in the last 10 days. Besides the flour mill the fire destroyed the oatmeal mill, the cooperage plant, the elevator, with 100,000 bushels of grain, and smaller buildings, the total loss being estimated at $500,000, with 75 per cent. of the loss insured. Three hundred employees are out of work.

Government Purchases

WASHINGTON, D. C., December 18, 1911.

The Bureau of Yards and Docks, Navy Department, Washington, will open bids January 13 for three 200-kw. motor generator sets and controlling panels.

The Department of the Interior, office of Indian Affairs, Washington, will open bids January 18 for furnishing labor and material for the erection of an acetylene gas lighting plant at the Yakima Indian School, Yakima, Wash.

The Isthmian Canal Commission, Washington, will open bids December 28, under canal circular 668, for motor driven air compressors, steel, steel cable, soil pipe, etc.

The Paymaster General, Navy Department, Washington, will open bids December 26, under schedule 4144, for four multicoil navy type evaporators and two multicoil navy type distillers; schedule 4145, class 72, for one automatic screw machine.

The United States Reclamation Service, Boise, Idaho, opened bids December 1 for drag line excavators as follows:

F. C. Austin Drainage Excavator Company, Chicago, Ill., $11,200 and $14,250; H. Channon Company, Chicago, Ill., $7,000; Lidgerwood Mfg. Company, Chicago, Ill., $16,500; Bucyrus Company, South Milwaukee, Wis., $8,200, $12,500, $12,440 and $12,500; Cylde Iron Works, Chicago, Ill., $9,500 and $12,000; Hey & Elsy Company, St. Paul, Minn., $5,700 and $4,200; Prest. Md. D. & C. Company, Baltimore, Md., $12,000, second-hand equipment .

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids December 12 for material and supplies as follows:

Schedule 4071, class 1, one 20-ton 4-motor, electric traveling crane in building 207, Mare Island, Cal.—Bidder 23, Cleveland Crane & Engineering Works, Wickliffe, Ohio, $6,385 and $6,625; 93, Morgan Engineering Company, Alliance, Ohio, $7,735; 94, Manning, Maxwell & Moore, New York, $7,175; 105, Norton Engineering Works, Detroit, Mich., $6,685; 107, Niles-Bement-Pond Company, New York, $7,205; 115, Pawling & Harnischfeger Company, Milwaukee, Wis., $6,200; 137, Toledo Bridge & Crane Company, Toledo, Ohio, $6,400; 148, Whiting Foundry & Equipment Company, Harvey, Ill., $5,895; 166, Cyclops Iron Works, San Francisco, Cal., $5,200.

Schedule 4073, class 21, two oil burning furnaces for Puget Sound—Bidder 92, Monarch Engineering & Mfg. Company, Baltimore, Md., $324.50 and $350; 102, Mire's Fuel Oil Equipment Company, Norfolk, Va., $345 and $390; 119, W. S. Rockwell Company, New York, $280.

Schedule 4082, class 51, one hand power traveling crane for delivery to Pearl Harbor, Hawaii—Bidder 14, Brown Hoisting Machinery Company, Cleveland, Ohio, $4,835; 69, Hoisting Machinery Company, New York, $1,671; 94, Manning, Maxwell & Moore, New York, $2,695; 105, Norton Engineering Works, Detroit, Mich., $1,890; 107, Niles-Bement-Pond Company, New York, $2,100; 148, Whiting Foundry & Equipment Company, Harvey, Ill., $1,787.

Schedule 4083, class 61, one surface condenser for Charleston—Bidder 8, Alberger Condenser Company, New York, $1,573; 38, M. T. Davidson & Co., Brooklyn, N. Y., $1,900; 110, Trustees of the Platt Iron Works, Dayton, Ohio, $1,496; 150, Wheeler Condenser & Engineering Company, Carteret, N. J., $2,255; 131, C. H. Wheeler Mfg. Company, Philadelphia, Pa., $1,786; 136, Williamson Bros. Company, Philadelphia, Pa., $1,820.

Schedule 4103, class 81, one universal milling machine—motor-driven with cutters for delivery to Portsmouth—Bidder 11, Brown & Sharpe Mfg. Company, Providence, R. I., $1,904.63 and $1,843.13; 16, Becker Milling Machine Company, Hyde Park, Mass., $1,589.32; 45, Fairbanks Company, Washington, D. C., $1,675.84; 48, Frevert Machinery Company, New York, $1,601.34; 94, Manning, Maxwell & Moore, New York, $1,458.45; 107, Niles-Bement-Pond Company, New York, $1,629.85; 172, Prentiss Tool & Supply Company, New York, $1,652.25 and $1,726.18.

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Vice-President Bury, of the Canadian Pacific Railway, stated at Vancouver a few days ago that a large sum would be expended in improvements on the Pacific division, including $2,000,000 in Vancouver alone. It is also announced by the Canadian Pacific Railway from Montreal that the company will shortly raise $45,000,000 for terminals, improvements to properties and building hotels from the Atlantic to the Pacific coast, at various centers.

Announcement is made that the Dominion Match Company has secured a site for the erection of its factory on what is known as the old Shaw property, between the Canadian Pacific Railway tracks and the Pitt River road, New Westminster, B. C. The property is about two and a half acres in extent. This factory will cost about $75,000 to erect and equip, and when in running order will employ 40 hands.

The Canadian Northern Coal & Ore Docks Company has begun the enlargement of its works at Port Arthur, Ont.

Several large contracts for machinery have been given out by the Canadian Pacific Railway Company for its new coal handling plant at Fort William, Ont.

Land in the vicinity of Edmonton, Alberta, has been purchased by the Canadian Northern Railway Company, and it is stated that large machine shops are to be erected there by the company.

It is announced from Winnipeg that the contract for the Canadian Pacific Railway shops at Calgary was let by Vice-President Bury to the Westinghouse, Church, Kerr Company, New York. It will commence work on the new buildings at once and is to have them finished by the end of next year. They will be of the same size as the Winnipeg shops.

The Canadian cereal merger lost a valuable plant December 15 in the total destruction by fire of the Robin Hood mills at Moose Jaw. The loss will be $200,000. The mills had a capacity of 1500 barrels. This is the third milling plant in the West destroyed in the last 10 days. Besides the flour mill the fire destroyed the oatmeal mill, the cooperage plant, the elevator, with 100,000 bushels of grain, and smaller buildings, the total loss being estimated at $500,000, with 75 per cent. of the loss insured. Three hundred employees are out of work.

Government Purchases

WASHINGTON, D. C., December 18, 1911.

The Bureau of Yards and Docks, Navy Department, Washington, will open bids January 13 for three 200-kw. motor generator sets and controlling panels.

The Department of the Interior, office of Indian Affairs, Washington, will open bids January 18 for furnishing labor and material for the erection of an acetylene gas lighting plant at the Yakima Indian School, Yakima, Wash.

The Isthmian Canal Commission, Washington, will open bids December 28, under canal circular 668, for motor driven air compressors, steel, steel cable, soil pipe, etc.

The Paymaster General, Navy Department, Washington, will open bids December 26, under schedule 4144, for four multicoil navy type evaporators and two multicoil navy type distillers; schedule 4145, class 72, for one automatic screw machine.

The United States Reclamation Service, Boise, Idaho, opened bids December 1 for drag line excavators as follows:

F. C. Austin Drainage Excavator Company, Chicago, Ill., $11,200 and $14,250; H. Channon Company, Chicago, Ill., $7,000; Lidgerwood Mfg. Company, Chicago, Ill., $16,500; Bucyrus Company, South Milwaukee, Wis., $8,200, $12,500, $12,440 and $12,500; Cylde Iron Works, Chicago, Ill., $9,500 and $12,000; Hoy & Elzy Company, St. Paul, Minn., $5,700 and $4,200; Prest. Md. D. & C. Company, Baltimore, Md., $12,000, second-hand equipment .

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids December 12 for material and supplies as follows:

Schedule 4071, class 1, one 20-ton 4-motor, electric traveling crane in building 207, Mare Island, Cal.—Bidder 23, Cleveland, Crane & Engineering Works, Wickliffe, Ohio, $6,385 and $6,625; 93, Morgan Engineering Company, Alliance, Ohio, $7,735; 94, Manning, Maxwell & Moore, New York, $7,175; 105, Norton Engineering Works, Detroit, Mich., $6,685; 107, Niles-Bement-Pond Company, New York, $7,205; 113, Pawling & Harnischfeger Company, Milwaukee, Wis., $6,200; 137, Toledo Bridge & Crane Company, Toledo, Ohio, $6,400; 148, Whiting Foundry & Equipment Company, Harvey, Ill., $5,895; 166, Cyclops Iron Works, San Francisco, Cal., $5,200.

Schedule 4073, class 21, two oil burning furnaces for Puget Sound—Bidder 92, Monarch Engineering & Mfg. Company, Baltimore, Md., $324.50 and $350; 102, Mirc's Fuel Oil Equipment Company, Norfolk, Va., $345 and $390; 119, W. S. Rockwell Company, New York, $280.

Schedule 4082, class 51, one hand power traveling crane for delivery to Pearl Harbor, Hawaii—Bidder 14, Brown Hoisting Machinery Company, Cleveland, Ohio, $4,835; 69, Hoisting Machinery Company, New York, $1,671; 94, Manning, Maxwell & Moore, New York, $2,695; 105, Norton Engineering Works, Detroit, Mich., $1,890; 107, Niles-Bement-Pond Company, New York, $2,100; 148, Whiting Foundry & Equipment Company, Harvey, Ill., $1,787.

Schedule 4083, class 61, one surface condenser for Charleston—Bidder 8, Alberger Condenser Company, New York, $1,573; 38, M. T. Davidson & Co., Brooklyn, N. Y., $1,900; 110, Trustees of the Platt Iron Works, Dayton, Ohio, $1,496; 150, Wheeler Condenser & Engineering Company, Carteret, N. J., $2,255; 151, C. H. Wheeler Mfg. Company, Philadelphia, Pa., $1,786; 156, Williamson Bros. Company, Philadelphia, Pa., $1,820.

Schedule 4103, class 81, one universal milling machine—motor-driven with cutters for delivery to Portsmouth—Bidder 11, Brown & Sharpe Mfg. Company, Providence, R. I., $1,904.63 and $1,843.13; 16, Becker Milling Machine Company, Hyde Park, Mass., $1,589.32; 45, Fairbanks Company, Washington, D. C., $1,675.84; 48, Frevert Machinery Company, New York, $1,601.34; 94, Manning, Maxwell & Moore, New York, $1,458.45; 107, Niles-Bement-Pond Company, New York, $1,629.85; 172, Prentiss Tool & Supply Company, New York, $1,652.25 and $1,726.18..

Current Metal Prices.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly report.

IRON AND STEEL—

Bar Iron from Store—

Refined iron:
1 to 1⅞ in. round and square.... ℔ 1.70¢
1½ to 4 in. x ⅜ to 1 in..... ℔ 1.70¢
1½ to 4 in. x ¼ to 5-1 ..... ℔ 1.80¢
Rods—⅝ and 11-16 round and square. ℔ 1.80¢
Angles: Cts. ℔ lb.
3 in. x ¼ in. and larger..... 1.80¢
3 in. x 3-16 in. and ¼ in. ..... 2.20¢
1½ to 2½ in. x ⅛ in..... 1.95¢
1½ to 2¾ in. x 3-16 in. and thicker.... 1.85¢
1 to 1¼ in. x 3-16 in. ..... 1.95¢
1 to 1¼ x ⅛ in. ..... 2.00¢
⅞ x ⅛ in. ..... 2.10¢
⅝ x ⅛ in. ..... 2.15¢
⅝ in. x ⅛ in. ..... 3.35¢
⅛ x 3-32 in. ..... 4.40¢
Tees:
1 in. ..... 2.25¢
1¼ in. ..... 210¢
1½ to 2½ x ¼ in..... 1.90¢
1½ to 2½ x 3-16 in..... 2.00¢
3 in. and larger..... 1.85¢
Beams ..... 1.80¢
Channels, 3 in. and larger..... 1.80¢
Bands—1¼ to 6 x 6-16 to No. 8..... 2.00¢
Burden's "H. B. & S." iron, base price.... 2.95¢
"Burden's Best" iron, base price..... 3.15¢
Norway bars ..... 3.60¢

Merchant Steel from Store—

per ℔

Bessemer machinery ..... 1.70¢
Toe calk, tire and sleigh shoe..... 2.50@3.00¢
Best cast steel, base price in small lots..... 7¢

Sheets from Store—

Black

	One pass, C.R. soft steel.	R. G. cleaned.
No. 16	℔ 2.40¢	2.75¢
Nos. 18 to 20	℔ 2.45¢	2.85¢
Nos. 22 and 24	℔ 2.50¢	2.95¢
No. 26	℔ 2.55¢	3.05¢
No. 28	℔ 2.65¢	3.25¢

Russia, Planished, &c.

Genuine Russia, according to assortment ..... ℔ 12 @14¼
Patent planished, W. Dewees Wood..... ℔ A. 10¢; B. 9¢ net

Galvanized

Nos. 12 and 14..... ℔ 2.75¢
No. 24 ..... ℔ 3.10¢
No. 26 ..... ℔ 3.30¢
No. 28 ..... ℔ 3.60¢

No 20 and lighter 36 inches wide. 25¢ higher.

Genuine Iron Sheets—

Galvanized

Nos. 22 and 24..... ℔ 5.50¢
No. 26..... ℔ 6.00¢
No. 28..... ℔ 7.00¢

Corrugated Roofing—

2½ in. corrugated.	Painted.	Galvd.
No. 24	℔ 100 sq. ft... $3.75	$4.70
No. 26	℔ 100 sq. ft... 2.85	3.90
No. 28	℔ 100 sq. ft... 2.50	3.65

Tin Plates—

American Charcoal Plates (per box)

"A.A.A." charcoal:
IC, 14 x 20..... $6.35
IX, 14 x 20..... 7.60
A. charcoal:
IC, 14 x 20..... $5.30
IX, 14 x 20..... 5.40

American Coke Plates—Bessemer—

IC, 14 x 20.....107 lb..... $4.20
IX, 14 x 20..... 5.20

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating..... $8.10
IX, 20 x 28 with an 8 lb. coating..... 10.10

Seamless Brass Tubes—

List November 13, 1908. Base price. 18¢

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908. Base price. 18¢

Copper Tubes—

List November 13, 1908. Base price. 21¢

Brazed Brass Tubes—

List February 1, 1911. 19¾¢ ℔

High Brass Rods—

List February 1, 1911. 14⅞¢ ℔

Roll and Sheet Brass—

List February 1, 1911. 15⅛¢ ℔

Brass Wire—

List February 1, 1911. 14⅞¢ ℔

Copper Wire—

Base price, Carload lots mill 14¾¢

Copper Sheets—

Sheet copper hot rolled, 16 oz. (quantity lots) ..... ℔ 18 ¢
Sheet copper cold rolled, 1¢ ℔ lb advance over hot rolled.
Sheet copper polished 20 in. wide and under, 1¢ ℔ square foot.
Sheet copper polished over 20 in. wide, 2¢ ℔ square foot.
Planished copper, 1¢ ℔ square foot more than polished.

METALS—

Tin—

Straits pig ..... ℔ 47 @48 ¢

Copper—

Lake Ingot ..... ℔ 14½@15 ¢
Electrolytic ..... ℔ 14½@14⅝¢
Casting ..... ℔ 14½@14½¢

Spelter—

Western ..... ℔ 7½@ 7¾¢

Zinc—

No. 9, base, casks... ℔ 9¢ Open... ℔ 9½¢

Lead—

American pig ..... ℔ 5½@ 5¾¢
Bar ..... ℔ 7 @ 7¼¢

Solder—

½ & ½. guaranteed..... ℔ 26¾@27¼¢
No. 1 ..... ℔ 24½@25 ¢
Refined ..... ℔ 23 @23¾¢
Prices of solder indicated by private brand vary according to composition.

Antimony—

Cookson ..... ℔..@10¼¢
Hallets ..... @10 ¢
Other brands ..... 9@ 9½¢

Bismuth—

Per ℔ $2.00@$2.25

Aluminum—

No. 1 aluminum (guaranteed over 99% pure), in ingots for remelting (ton lots)..... 21¢
Rods and Wire..... Base price 31¢
Sheets ..... Base price 33¢

Old Metals—

Dealers' Purchasing Prices Paid in New York.

Copper, heavy and crucible..... 12.25
Copper, heavy and wire..... 12.00
Copper, light and bottoms..... 11.00
Brass, heavy 8.50
Brass, light 6.50
Heavy machine composition..... 10.50
Clean brass turnings..... 8.00
Composition turnings 8.50
Lead, heavy 4.00
Lead, tea 3.75
Zinc, scrap 4.50

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Nearly half a century ago **Nicholson** Files established a reputation for exceptionally keen bite and long life. Users began to insist on the files that bore **"Nicholson"** on the tang.

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